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ANTITRUST POLICY AND JOINT RESEARCH AND DEVELOPMENT VENTURES

HEARING

BEFORE THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

NINETY-EIGHTH CONGRESS

FIRST SESSION

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ANTITRUST POLICY AND JOINT RESEARCH AND DEVELOPMENT VENTURES

THURSDAY, NOVEMBER 3, 1983

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The committee met, pursuant to notice, at 9:35 a.m., in room 2203, Rayburn House Office Building, Hon. Dan Lungren (member of the committee) presiding.

Present: Representative Lungren.

Also present: Christopher J. Frenze and Nathaniel W. Thomas, professional staff members.

OPENING STATEMENT OF REPRESENTATIVE LUNGREN, PRESIDING

Representative LUNGREN. Good morning. It gives me great pleasure to chair this hearing of the Joint Economic Committee on antitrust policy and joint research and development ventures. Today we are fortunate to have a distinguished group of expert witnesses to address this topic.

Over the last decade the international competitiveness of U.S. industry has gradually deteriorated. While structural changes in certain U.S. industries undoubtedly reflect an emerging comparative advantage in some foreign countries, I am convinced that a large part of the problem arises from economic stagnation in our Nation. For example, rates of saving and capital formation in the United States have long lagged behind those of our strongest trade rivals. To some extent, this has been a result of inadequate tax incentives and defective regulatory policy. And although considerable progress along this line has been made in recent years, much remains to be done.

In some areas, unnecessary government restraints on U.S. businesses still hamper their ability to compete in world markets. Antitrust policy, for instance, can increase the risk and cost of an activity to excessive levels. Today we will examine antitrust policy regarding joint research and development ventures. Businesses form such ventures to minimize costs, share risks, diffuse technological innovation, and achieve economies of scale. Collaborative research and development can lessen unnecessary and costly duplication while bringing the complementary strengths of different firms to bear on a common objective. In high-technology industries, vigorous R&D programs are essential for success, or even for survival. With joint R&D, the end result is often a cheaper and more efficient way of creating and using new technology.

Currently, formation of joint ventures are not necessarily treated as per se violations of the antitrust laws, even if some lessening of competition in research occurs. Joint R&D ventures tend to encourage competition and consumer welfare in several ways. So long as workable competition prevails in the product markets, lower R&D costs will ultimately result in lower consumer prices. Furthermore, joint ventures of this type make research and development more accessible to smaller businesses.

By diffusing R&D to smaller businesses, joint ventures make it possible for them to challenge much larger firms that often have their own laboratories. Surely participating in these ventures by medium or even fairly large firms is procompetitive, so long as rivalry with the dominant companies is intensified. On balance, the formation of joint ventures in and of itself is likely to enhance competition. However, we all recognize that businesses joining together in this way could make collateral agreements that would be per se violations of the antitrust law.

Apart from these per se violations, the rule of reason is applied to the formation of joint R&D ventures. Unfortunately, however, the legal and economic criteria necessary for evaluating the practice of joint R&D ventures, in light of the rule of reason, appears to be lacking. To my knowledge, no Supreme Court decisions have been rendered involving joint R&D ventures, and the existing case law is minimal at best.

This uncertain legal climate was one factor that prompted the Department of Justice's issuance, in November 1980, of its "Antitrust Guide Concerning Research Joint Ventures." This guide, although helpful, appears not to resolve all the ambiguities in the law. This excessive uncertainty has had a chilling effect on the formation of some joint ventures. Especially when ventures include large firms in a market, or are conducting applied product research, the legal threat becomes potentially serious and the possibility of treble damages compounds this threat. In sum, it appears there are still too many gray areas in the law.

By perpetuating this uncertainty, government policy may hinder the ability of U.S. firms to compete in world markets on the same footing as their foreign rivals. I am not arguing that clarification in the law regarding joint R&D ventures would solve all of our trade problems; but there is no rational reason that the U.S. Government should maintain policies which make it difficult, sometimes impossible, for U.S. firms to compete. U.S. companies have enough problems coping with the practices of foreign governments without having to worry about our own Government.

One of the reasons we have called this particular hearing is that in some other committees on the Hill dealing with specific legislation, it appeared that they were proceeding on the assumption that there was a need for such legislation, however, some people questioned whether this need really exists. It appeared to me we should have a hearing in this committee, which does not have legislative responsibility, to discuss the issue of the need for clarification of the law and to establish for the record what that need is.

So I am very pleased that we have the distinguished witnesses we have today.

I will proceed in this manner. I will have my colleague, Ed Zschau, appear first and give his testimony, and then the Assistant Attorney General, William Baxter, will appear for his testimony. Then we will have a panel made up of the remaining witnesses for some discussion and, hopefully, some debate.

So, Ed, if you will please join us. Let me just say that your testimony will be placed in the record in total, and you may proceed as you wish.

STATEMENT OF HON. ED ZSCHAU, A U.S. REPRESENTATIVE IN CONGRESS FROM THE 12TH CONGRESSIONAL DISTRICT OF THE STATE OF CALIFORNIA

Representative ZSCHAU. Thank you very much, Congressman. I appreciate the opportunity to appear before you and this distinguished committee this morning to discuss the need for legislation to encourage R&D joint ventures.

Let me begin by commending you and the committee for holding this and the many other hearings that you have held seeking insight into how the United States can maintain its technological leadership and increase its industrial competitiveness.

As you know, my congressional district, which is often called the Silicon Valley in California, has had an outstanding record in advancing technology and creating new jobs. I feel this has come about because of the atmosphere of entrepreneurship there, and particularly, because so many people in that area were willing to take the risks associated with advanced research and development. There are about 700 high-technology companies in my district in the computer field, microelectronics, and, more recently, in genetic engineering.

While our achievements in the past have been outstanding, we can't afford to relax. The rate of technological change worldwide is accelerating. We are going to have to accelerate our research and development efforts in this country.

I believe that R&D joint ventures are needed to maintain our technological leadership against worldwide competition. I believe this for several reasons which I will outline briefly.

No. 1, R&D is often too expensive and too risky to be pursued by individual companies. I am talking particularly about cutting-edge research and development. The further and the faster we push the limits of our knowledge and our technologies, the costlier and riskier those R&D efforts become.

For example, increasing the speed and densities of microelectronic circuits by a significant multiple, which is going to be necessary in order to maintain our leadership in that area, may require resources and involve risks that no single U.S. company can afford. However, if several companies pool their research resources to pursue such projects and share the risk of such projects, they could together achieve the research results which would keep the dominance in microelectronic circuitry here in America.

No. 2, we have to recognize that there is a growing scarcity of trained technical people in the United States which will require—again if we are going to maintain our technological leadership—that we avoid

duplication of effort and get the most out of our available technical talent. It is projected that the future demand for engineers and technicians in the United States will far outstrip the supply, due to a capacity shortage in our college-level science and engineering programs. As a matter of fact, the American Electronics Association has forecast an annual shortfall of 16,000 electrical engineers and computer scientists through 1987. That is a total shortfall of 90,000 unfilled technical positions, given the projected demand of our technological companies.

We must initiate actions immediately to try to increase the capacity of our college-level educational facilities. In the meantime, many firms in the United States are looking to find ways to avoid duplication of technical effort and get the most out of their scarce technical resources. Pooling research resources from several companies in R&D joint ventures would be an effective way to increase the results they could obtain from the available technical talent.

No. 3, we have to recognize that U.S. companies are facing intense competition from business consortia in other countries, which are not only permitted but are often encouraged. They are often subsidized by their governments.

For example, over the next decade America's dominance in the computer industry will be challenged from abroad. There is no question about that. The challenge is going to come from Japan. In 1981, the Japanese Government announced a national project designed to make Japan No. 1 in the computer industry by the late 1990's. This is a project to develop a fifth-generation computer.

The Japanese research program, importantly, involves a consortium of companies coordinated by the Japanese Government, which will ultimately cost about a billion dollars over a 10-year period.

I believe that a concerted effort in the United States will be needed in order to meet this competitive challenge. The fifth-generation project is simply too large and too daring for an individual company to justify pursuing alone. Clearly, R&D joint ventures are going to be needed, not only to meet this competitive challenge but others as well.

I might also note that in addition to the fifth-generation computer project, the Japanese have a consortium designed to develop very large scale integrated circuits in order to enable the Japanese companies to be dominant in that area, too.

No. 4, in addition to meeting the competition from abroad and getting the most out of scarce technical resources and providing the type of efforts that are needed in cutting-edge R&D, I think we should also recognize that joint R&D programs may be one of the tools to enable ailing companies in our so-called smokestack industries to solve common problems and save jobs through increased competitiveness.

We cannot ignore these so-called ailing industries. There are some in this body that wish to forget about them and concentrate on the sunrise industries, but, frankly, the ailing industries can be rejuvenated. However, they can only be rejuvenated, in my opinion, by the application of technology and new approaches that will make them more competitive. Although it may be difficult for them to overcome their common problems working alone, pooling their resources in R&D joint ventures to seek solutions may be feasible. In fact, it may be the

only way, without Government intervention, for these companies to become competitive again and save jobs.

That's the need that I see for R&D joint ventures in this country. Unfortunately, Congressman Lungren, despite the many advantages of a joint R&D program, U.S. companies are reluctant to pursue them. As you pointed out, the antitrust laws regarding such entities are unclear, and the risks of unjustified antitrust suits are too great for the companies to take these risks.

I am sure you are all familiar with the recent example of MCC, an R&D joint venture that was formed under the leadership of the visionary chairman of Control Data Corp., William Norris, who has recognized the competitive threat to America's computer industry posed by consortia of companies from abroad. You will have witnesses later in this hearing from Control Data so I won't go into that story. They can tell it much better than I. However, that story is an example of a joint venture formed by the leading computer companies in the United States in order to meet a competitive challenge, to increase competitiveness rather than reduce competitiveness. Yet, in spite of that and in spite of the fact that its formation was blessed by the Justice Department, the MCC founders soon received, after formation of the joint venture, a letter from an enterprising San Francisco attorney putting them on notice that its continued operation could trigger an antitrust action with possible treble damages.

There is enough risk in high technology and business in general without the additional risk—when we are trying to be competitive against foreign companies—of the antitrust laws being used against us. I can tell you that there are firms who declined to participate in MCC because they feared action, and I can also tell you that other companies that could benefit from forming other R&D joint ventures are not going to do so unless and until Congress acts. That is, Congress must clarify the antitrust laws and specifically change them in a way to permit such procompetitive R&D joint ventures to form. Otherwise, though needed, joint R&D will not be done.

In conclusion, I believe that improving the ability of American industry and American workers to compete in domestic and international markets must be a major policy objective of the United States. The continued development of new technologies and their application in established industries is essential if our Nation is to accomplish this objective. I believe enacting legislation that modifies our antitrust laws to permit R&D joint ventures would enhance U.S. competitiveness and would be an important step to insuring that U.S. technological leadership is maintained.

I want to thank you once again, Congressman Lungren, for holding these hearings, for allowing me to share my ideas with you and the committee. And I would be delighted to answer any questions you might have.

[The prepared statement of Representative Zschau, together with an attachment, follows:]

Prepared Statement of Hon. Ed Zschau

Legislation to Encourage Research and Development Joint Ventures

Summary:

1. R & D joint ventures could be an important vehicle to increasing U.S. industrial competitiveness.

- Needed R & D is often too expensive or too risky to be pursued by individual companies;

- The scarcity of trained technical personnel in the United States requires that we avoid duplication of efforts and get the most out of our available technical talent;

- U.S. companies are facing intense competition from business consortiums in other countries which are encouraged (and sometimes subsidized) by their governments;

- Joint R & D programs may enable ailing companies in our so-called "smokestack" industries to solve common problems and save jobs through increased competitiveness.

2. Today, companies are reluctant to do joint R & D work because of the lack of clarity of antitrust laws and the risk of unjustified suits.

3. Our antitrust laws should be modified to permit R&D joint ventures that enhance U.S. competitiveness.

Legislation to Encourage Research and Development Joint Ventures

Mr. Chairman, I appreciate the opportunity to appear before your distinguished committee this morning to discuss legislation needed to encourage research and development joint ventures. I commend you for holding this and other hearings seeking insight into how the United States can maintain its technological leadership and increase its industrial competitiveness.

My congressional district--a region in Northern California often called "Silicon Valley"--has had an outstanding record in advancing technology and creating new jobs. It has done so through an effective combination of entrepreneurship and advanced research and development. Currently, there are approximately 700 high technology firms in and around my district in fields ranging from microelectronics to genetic engineering.

Although our past achievements in technology have been inspiring, we can't afford to relax. The rate of technological change worldwide is accelerating. If we are to fulfill President Reagan's commitment to "keeping America the technological leader of the world now and into the 21st Century" we'll have to increase our research and development efforts in this country.

R&D JOINT VENTURES ARE NEEDED

The further and faster we push the limits of our knowledge and our technologies, the costlier and riskier those R&D efforts become. For example, increasing the speed and densities of microelectronic circuits by a significant multiple now may require resources and involve risks that no single U.S. company can afford. However, several companies might be able to pool some of their research resources, share the risk of such a project, and help keep dominance in microelectronic technology here in America.

A major obstacle to maintaining our technological leadership in the coming years is a projected scarcity of trained technical personnel in the United States. The future demand for engineers and technicians is predicted to outstrip the supply by a wide margin due to a capacity shortage in our college-level science and engineering programs. The American Electronics Association has forecast an annual shortfall of 16,000 electrical engineers and computer scientists through 1987--that's 90,000 unfilled technical positions.

While we must initiate immediately actions to expand our technical education system, getting results will take time. In the meantime, many firms in the U.S. are looking to find ways to avoid duplication of technical effort and get the most out of their scarce technical talent. Pooling research resources from several companies in R&D joint ventures would be an effective way to increase the results they could obtain from the available technical personnel.

Over the next decade, America's dominance in the computer

industry will be challenged from abroad. The challenge will come from Japan. In 1981, after three years of extensive planning, the Japanese government announced a national project designed to make Japan number one in the computer industry by the late 1990s. It's a project to develop a 5th Generation Computer--a machine so advanced in hardware and software that it will be able to "reason with knowledge" like a human being rather than just computing with numbers or processing information. The Japanese research program, involving a consortium of companies coordinated by the Japanese government, could ultimately cost a billion dollars over ten years.

A concerted, team effort will be needed for the U.S. computer industry to meet this competitive challenge. However, a project to develop a 5th generation computer is simply too large and too daring for an individual company (with the possible exception of IBM) to justify pursuing alone. Clearly, R&D joint ventures will be needed.

This year, President Reagan formed a Presidential Commission on Industrial Competitiveness. It is chaired by one of my Silicon Valley constituents, John Young, President of the Hewlett-Packard Company. The objective of the Commission is to determine how the United States can improve its competitiveness and world market share in not only those industries such as technology, where we are currently competitive, but also in those so-called "smokestack" industries where we have lost our competitive edge.

I believe that the ailing companies in our mature industries can be rejuvenated. I believe that application of technology and new approaches to those industries will play a major role in making them more competitive. Although it may be difficult for them to overcome their common problems working alone, pooling resources in R&D joint ventures to seek solutions may be feasible. In fact, it may be the only way, without government intervention, for these companies to become competitive again and save their jobs.

COMPANIES ARE RELUCTANT TO FORM R&D JOINT VENTURES

Despite the many advantages of joint R&D programs, U.S. companies are reluctant to pursue them. The antitrust laws regarding such entities are unclear and the risks of unjustified antitrust suits are too great. Imagine the reaction if the major automobile companies formed a joint venture to conduct research on a new, fuel efficient car or the major steel companies formed an R&D joint venture to develop more efficient production processes or new speciality steel products. Although such joint projects might be in our national interest and increase competition, they would appear to fall within the scope of antitrust legislation and be subject to litigation. With the uncertainty of their legality and the specter of treble damages, it's no surprise that such joint projects are not pursued and seldom even proposed.

A recent example illustrates the disincentives to forming R&D joint ventures. The visionary chairman of Control Data Corporation, William Norris, recognizing the competitive threat to America's computer industry posed by consortiums of companies

from abroad, formed an R&D joint venture--Microelectronics and Computer Technology Corporation (MCC)--to develop advanced computer hardware and software technology. Even though detailed conditions to ensure competitiveness (e.g. the joint venture would be open to all industry participants and the results available to any company under license) were written into its by-laws and its formation was "blessed" by the Justice Department, the MCC founders soon received a letter from San Francisco attorney Joseph Alioto (attached) putting MCC on notice that its continued operation could trigger an antitrust action and possible treble damages. Although Norris and the other MCC participants were not deterred by this threat, the risk of a costly and time-consuming antitrust action, no matter how unjustified, must be added to the already large technical and market risks in their daring project.

ANTITRUST LAWS SHOULD PERMIT R&D JOINT VENTURES

While MCC continues along its pioneering trek, I can report to this Committee that there are firms who declined participation in MCC because they feared antitrust action against the joint venture. The possibility of a time-consuming and costly battle over MCC's legality outweighed in their eyes the possible benefits they might reap from participation in the venture. For the same reason, other companies that could benefit from forming R&D joint ventures will not do so unless and until Congress acts.

Their hesitation is understandable. The managers, scientists, and engineers who want to form joint R&D ventures want to perform R&D. They don't want to perform lengthly, complex, and expensive analyses of the legality of their activities. They don't want to spend their time defending against enterprising attorneys who seek to profit by using the vagueness in the antitrust law to convince a court that a R&D joint venture, which in reality would enhance competition, is illegal.

Our antitrust laws have been on the books for nearly 100 years. They have served our nation well by providing the basic economic ground rules that brought the U.S. economy out of the agrarian era to its current position of industrial leader of the world. Now they must be reviewed and updated to reflect the realities of competition in today's world market economy.

With this in mind, I believe our antitrust law should not be silent on the issue of research and development. Rather, our antitrust laws should promote R&D by providing the necessary clarity needed for potential R&D joint venturers to proceed when such joint ventures would serve to enhance competition.

In conclusion, Mr. Chairman, I believe that improving the ability of American industry and American workers to compete in domestic and international markets must be a major policy objective of the United States. The continued development of new technologies and their incorporation into established industries is essential if our nation is to accomplish this objective. Enacting legislation that modifies our antitrust laws to permit R&D joint ventures that would enhance U.S. competitiveness would be an important step to insuring U.S technological leadership.

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Gentlemen:

In an article which appeared in the January 25th evening edition of the San Francisco Examiner, a copy of which I am enclosing, it is reported that your respective companies intend to form a combine to regulate research, development and innovations in the "microelectronics and computer" industry, and that your companies are capitalizing this venture with "initial" contributions of $50 to $100 million.

As an attorney whose practice has been limited to antitrust litigation, I wish to advise you that, in my opinion, your contemplated conduct is an unequivocal combination in violation of the antitrust laws of the United States. The effect that your agreement will have upon competition and innovations in

the otherwise dynamic and exponentially expanding electronics industry is obvious--not to mention the destructive impact on the establishment of new submarket industries and jobs. Equally clear is the purpose of your cartel, which anyone could plainly deduce even without the gratuitous remarks ascribed to Mr. William Shaffer about how your group would have restricted the development and invention of the wheel.

The reported "clearance" letter from the Antitrust Division of the Department of Justice is not remarkable. Even a student of the antitrust laws knows that the present Antitrust Division, under the aegis of Mr. William Baxter, has abdicated its historical responsibility to enforce the law by purposefully refusing to prosecute clearly unlawful price-fixing agreements, approving the most egregious mergers our country has ever had to tolerate, advocating the suppression of innovations by large companies if it is in their economic interest to do so, dismissing meritorious antitrust suits throughout the country or otherwise entering into consent decrees or settlements which amount to nothing more than imperceptible slaps of the hand, and filing countless amicus curiae briefs in favor of adjudicated antitrust violators. It is patently clear to any impartial observer that the Antitrust Division believes that the "benefits" derived from concentrations of economic power in the hands of combines should be substituted for competition, the infusion of capital to build new factories and refineries and the creation of new jobs and industry.

As you must know, or at least do now, a "clearance" letter from the Antitrust Division is not an authorized grant of immunity from private antitrust enforcement. Neither the Courts, the law nor private parties are the least bit bound by Mr. Baxter's philosophy of what the antitrust laws should say or how they should be interpreted.

I do not know how, where or in what manner your companies, all competitors, managed to get together and discuss, much less agree upon, how research and development in the electronics industry will be controlled and allocated. Indeed, the mere fact that your companies utilized some non-apparent lines of communication is itself startling and would, with any other Antitrust Division, be more than enough to conduct a grand jury investigation to ascertain what these avenues are, how long they have existed, and what matters were discussed. But however disturbing it may be to know that such lines of communication

exist, that fact is not nearly so astonishing as the fact that your companies were able to utilize those lines to the extent of reaching such an agreement as the one reported in the newspaper.

I respectfully submit to you that your company should reconsider the advisability of your action and abandon your anticompetitive plans. I submit to you that your company should maintain its dignity by refusing to join the combine, and instead spend the money you were going to contribute on your own projects. I submit that you should not be afraid of competition, and that you should respect our free enterprise system, knowing that in the long run it will be to the benefit of your company, as well as to the benefit of the people and the country as a whole. Indeed, as you must know, all of the great inventions and innovations which our country has brought to the world were the result of two or more companies or individuals independently working on the same projects and racing against each other to come up with something new, exciting and useful first. Because of that competition, products and processes were developed faster, cheaper and better than they otherwise would have been. It would be terrible if this competitive activity were restrained in any industry. It would be unforgiveable if it happened in electronics.

If your company nonetheless chooses to proceed with the combination, then at least you do so with full knowledge of the potential consequences.

Sincerely,

Joseph M. Alioto

Joseph M. Alioto

JMA:jrh

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Representative LUNGREN. Because we only have limited time, let me try to ask a couple of questions very quickly.

In testimony before the committee, a suggestion was made by a member of that distinguished law firm that you mentioned that, in fact, there is no cry from the Silicon Valley for this type of legislation. Allegedly, a number of the small firms are fearful that allowing this change in antitrust law for purposes of R&D would result in the gobbling up some of the smaller firms and would benefit only the larger firms.

That was a blanket statement made. I would ask you to respond to that.

Representative ZSCHAU. As I mentioned, I have 700 high-technology companies in my district. I should point out that most of those are small companies. About two-thirds of them have fewer than 200 employees. But the small companies in my district—and in the high-technology field in general—do not expect to be small companies forever.

Those of us who have been in the electronics businesses or other businesses, even though we may have been small at one time, have visions of becoming larger. I think that is the kind of attitude that is reflected throughout the Silicon Valley.

I give that background—the number of companies and the fact that many of them are small—in order to provide some context for the statement I am going to make. I have heard from no company in my district asking me to work against this change in antitrust law. There are probably many companies who would not take advantage of it, because they would prefer to develop their own ideas alone. However, there has been no company that has contacted me as their congressional representative and has criticized this pending legislation. There is no opposition to it that I know about.

Representative LUNGREN. Let me ask this: We also had a report in one of our other committees from a consultant who had done a review of the literature, and his conclusion was that we had no legal proof that showed that firms fail to get together for joint research and development because they feared antitrust complications.

How would you respond to that?

Representative ZSCHAU. I think it would be better to address that question to the people from Control Data Corp. who were instrumental in organizing MCC, which is an example. From what I have been told, when that idea was first advanced, there was a lot of concern about what the antitrust implications might be, not just from the formation of a joint venture, but the mere discussion of the formation of the joint venture among parties in the same industry.

I suggested earlier in my testimony that one of the ways in which our smokestack industries—our automobile companies or our steel companies—might be able to meet foreign competition and regain market share would be to get together to develop joint products. But I would ask the person who suggested there is no obstacle currently to getting together what the reaction might be if the Big Three automobile manufacturers decided they were going to do a joint research program, or the major steel companies decided to join forces.

I think the evidence is clear and will be enhanced by what the people from Control Data are able to tell you, that there is concern, not just about forming research and development joint ventures, but the mere discussion of the forming of them. We must eliminate that concern through changes in the legislation.

Representative LUNGREN. Thank you very much, and I appreciate your testimony.

Now, if we could hear from William Baxter, the Assistant Attorney General for the Antitrust Division.

Again, Mr. Assistant Attorney General, we will include your prepared statement in the record, and you may proceed as you wish. Thank you for taking the time to be here.

STATEMENT OF WILLIAM F. BAXTER, ASSISTANT ATTORNEY GENERAL, ANTITRUST DIVISION, DEPARTMENT OF JUSTICE

Mr. BAXTER. Thank you very much, Congressman. It is a personal pleasure to have an opportunity to talk about this problem with this particular committee. It is a problem that I have been thinking about and writing about for over 20 years, and one which is very important to me.

The fairly obvious fact is that there is nothing wrong with our science establishment. One need only take a look at the pattern of Nobel awards and any of a variety of other indications to see that. Our problem is that the abstract and basic research is not being converted, with the speed that one would wish, into new products and services. The basic research in the main is sponsored by the Government, often done either through Government laboratories or universities. Our history is that the process of making that new information operational and embodying it in goods and services is a task that has been left to private industry. However, the rapidity with which industry has been performing that function has, I think, slowed, and the effect of this slowing is showing up, as you have indicated, in our ability to compete in international markets.

And one must ask that is so. There are, as you indicated in your very sophisticated opening statement, I think, a number of reasons—including capital formation and tax policy. I do not intend to suggest that the matters we intend to talk about today are any panacea, but I do think they are an important part of the problem.

One issue that has received much discussion in recent months is the research and development joint venture, and, of course, I do want to talk about that. Since it seems to be the primary focus, perhaps I will spend most of my few moments talking about that. But I am very anxious to stress that there is another, closely related but still, quite different, problem.

If we are to expect private enterprises to pursue research and development projects, we must recognize some of the characteristics of those projects and of their fruits.

First of all, these projects are risky. The most frequent result of any particular research effort is failure. Failure rates greatly exceed even modest success stories and totally overwhelm large breakthroughs.

But if these projects are to be done by the private sector, it will be because in some sense the projects can be expected to contribute to the bottom line, to profitability. And that has the implication that to be successful these efforts must be profitable. They must be sufficiently profitable, not only to cover their own costs but to cover the costs of the statistically associated failures which numerically and usually, in dollar terms, will predominate over the outlays associated with the successful projects.

The results of research and development are information. Once you have it, it is very hard to keep it a secret. It is even more difficult to keep it a secret once you start using it or actually embodying it in products and services. And if your competitors can come along and copy, produce, and market the same goods and services without having undertaken the costs of the underlying R&D, the successful projects will not contribute the necessary stream of profits that is necessary to drive the system.

Economists talk about this problem as a problem of appropriation of the information. Somehow or other we have to make the creation of valuable information profitable, and we have attempted to do that through our intellectual property laws, our patent laws, our copyright laws, our trade secret laws, all of which operate by giving the party who made the informational contribution an exclusive right to use that information for a period of time.

Now, this second problem to which I am referring, and one which I think, quite frankly, is much more serious in quantitative terms than the joint R&D problem—although I do not mean to trivialize joint R&D at all—is the fact that the courts over the years, reacting in a verbal way to the technique of these intellectual property laws in inferring exclusive positions, have characterized those exclusive positions as monopolies. Based on this characterization, the courts have jumped immediately to the conclusion that there is some sort of tension between the antitrust laws and our intellectual property laws, and as a result have interpreted the antitrust laws in an extreme manner which has seriously undermined the integrity and the efficacy of our intellectual property laws.

As you know, Congressman, titles III, IV, and V of the administration's bill are addressed to this problem and in a general way tell the courts to take into account the value of the information, the economic importance of the R&D process. Those titles tell the courts there is no inconsistency between these two bodies of law; they are both intended to make their private free-enterprise system work, to make markets work, and essentially attempt to induce the court to relocate the interface between the antitrust laws on the one hand and the intellectual property laws on the other.

I strongly urge the committee, in its focus on the research and development problem, not to lose track of, or underestimate the enormous importance of, titles III, IV, and V in that legislation, as compared to title II on joint R&D.

As to the joint R&D, the observations made in your opening statement are quite correct. There are no cases that hold joint R&D to be a violation of the antitrust law, Supreme Court cases or otherwise. There are a few old cases dealing with non-R&D joint ventures that suggest that joint ventures between competitors are illegal, maybe

even illegal per se, and there is really very, very little case law in that area.

Can we then prove that this uncertainty is interfering with the formation of joint research and development? I think it is very, very difficult to prove. One can only rely on the statements one hears by people in the marketplace. It seems to me the answer is, inevitably, "yes." It seems inescapable that such uncertainty has deterred some joint R&D activity, and, at least in some cases, it probably has discouraged joint R&D, but we just don't know how many cases. And that is the really only honest thing that can be said that we do not know how great an effect this uncertainty has had.

On the other hand, one does not really need to know those specifics. All one really needs to know is that there is a potential problem there, and if we can move that problem out of the way without doing any harm to other efforts, certainly we ought to do that. We believe that this desirable result can be achieved by adopting title II of the National Productivity and Innovation Act, a bill that we prepared.

One must recognize, however, that there can be competitive problems associated with joint research and development. There are competitive problems of two quite different kinds.

If a number of companies who presently participate as competitors in some particular goods and services market get together to do joint research and development, and particularly if the project is over on the development side as opposed to the research side, so that the business people rather than the scientists are necessarily playing a role in the process, there is very serious danger that common understandings and expectations about pricing and output of the existing goods and services market will be affected. Temptation to collusion can be quite difficult to resist. So we have to guard against overinclusiveness in the joint R&D venture of people who presently participate in goods and services markets, whether or not those are the markets at which the research is aimed.

What constitutes overinclusiveness in a particular fact setting, of course, depends on the structure of the industry from which they come, how many firms there are there, and a number of other variables. I do not mean to say one could not sit down and write a standard for determining overinclusiveness that would be sensible as applied to that problem, but I would have to say that the substantive standards that I have read in the bills that I have seen do not make any sense out of that problem.

There is a second, quite distinguishable, problem about joint R&D which again calls for a similar kind of market analysis. This time the focus should be on identifying the other firms that might compete in doing that kind of R&D rather than on the firms that are presently competing in some goods and services markets. Now, our concern should be not to permit too large a fraction of all possible participants in this area of R&D into a single joint venture, because in doing R&D, as well as in all other areas of our activity, we should seek to preserve competition and interfirm rivalry, to the extent we possibly can.

Now, with respect to both markets—and this second market is often somewhat harder to define when you ask who are elected participants in fifth-generation computers or whatever it may be, but it is not an impossible question to answer.

With respect to both those markets, if the proposed venture includes only, say, 15 percent of the possible participants, with the consequence that there is room for four or five more ventures of a similar type—not that they have to be in existence, simply that the possibility for forming four or five such ventures exists—there cannot be any problem. One can almost recognize safe harbors there.

But as a joint venture becomes more encompassing of either one of these two markets, one begins paying a cost, at least probabilistic. And I do not mean to suggest for a minute that cost should never be paid, but above 15 or 20 percent, certainly, one should begin asking the question, "Is the absolute level of dollars that must be committed so large that it really requires as much inclusiveness of firms in this market as we see here in order to get the job done?"

Now, if the degree of inclusiveness can be justified with reference to the scale of the project to be undertaken, one should go along with more inclusiveness. But one should become progressively more reluctant and more demanding in terms of the solidity of the proof that that much inclusiveness is needed as the percentage gets higher and higher and higher.

There is a tipping point at 50 percent that deserves some separate attention. Once you say, "Yes, this project justifies 55 percent of the firms in the industry getting together to do that R&D," you have an impossible problem with respect to the 45 percent that are left out. By the answer you have just given to the first question, you are saying that the remaining 45 percent cannot, as a practical matter, form their own group and do this very important part of R&D.

So now the equitable claim for admission to the venture of the remaining 45 percent, at least to the fruits of the venture, becomes overwhelming. But once everybody in the industry is entitled to the fruits of the venture, for all practical purposes, you have eliminated the patent laws and the copyright laws with respect to that aspect of the industry. Why should anybody under those circumstances contribute more dollars to this year's budget for the project rather than less? There is no possibility of getting ahead of one's competitors because they will be entitled to whatever comes out of the venture. At the same time, there is no possibility of falling behind one's competitors because you will be entitled to whatever comes out of the venture. Everybody is in a position to sit back and rest on his oars under those circumstances. So we should be very, very resistant of aggregations that are that encompassing.

Representative LUNGREN. May I interrupt. The second bell is on the vote. I have to go over and vote, and I will be back as soon as I can, probably in above 5 minutes.

Mr. BAXTER. All right.

[A short recess was taken.]

Representative LUNGREN. Please proceed.

Mr. BAXTER. Congressman, if I may resume, thank you.

I have been talking about these two different markets in which one must assess the competitive effects of joint R&D activity. The first market may be as small as a city, or a region in the United States, or a national market, or sometimes an international market. And one looks at whatever kind of a market it is when one asks this question about inclusiveness.

The second market will almost always be an international market because research and development is an international activity. So you are less likely to have the problem with respect to the second market, what I call the R&D market, than you are with respect to the goods and services market.

Now, having said that, it gives rise to the question whether the legislation should attempt to articulate a substantive standard about inclusiveness, or whether one should simply leave that to the antitrust laws. I make no effort to avoid the reality that there is very little clarity in the antitrust laws at the present time, but I do think it is clear that the courts are going to operate along the lines I have just suggested. Whether they will come down with a 15-percent test or a 20-percent test, I do not purport to be able to say. But I am quite confident that will be the general approach that the courts take in this area, and it is a sensible approach. My own proclivity would be to leave the courts alone in that regard. I think they will do an adequate job just given the push that title II would give them, telling them not to use the per se concept, and telling them they must take the benefits of joint R&D activity into account and not merely possible anticompetitive effects.

If, on the other hand, the Congress were strongly to believe that it was necessary to have some substantive standards, it should track that set of ideas, and we would be happy to work with this committee on the language.

Finally, if I may take one more moment, Congressman, there is one other point I would like to make.

A number of the bills would require that, after some period of time, usually a fairly short period of time, the fruits of the R&D effort be available to everyone through a mandatory licensing procedure.

Now, a mandatory licensing procedure is not made nonmandatory because you can charge royalties. Someone comes around and says, "I would like a license, please. I propose to pay you 2 cents a week." And the companies in the group then say, "No, no, that is not a reasonable royalty." And you are off on a huge battle about what is a reasonable royalty. And who can say what a reasonable royalty is? A reasonable royalty is a royalty for which a party who is free to negotiate would negotiate. But you have not left these parties free to negotiate.

I have just made the point that a successful effort must carry the costs of unsuccessful efforts as well. But how much of your last 10 years' R&D efforts do you get to load on this one successful project and demand to amortize there in the context of "a reasonable royalty?" You are creating an absolute snakepit by a provision such as that, and the administration would strongly oppose it.

I distinguish very sharply a situation, such as that embodied in several pieces of legislation, from one in which the parties to a particular venture say, "It suits our purposes to require of all our membership that there be a licensing program after 3 years" or "7 years," or some other number of years.

If the parties to a particular venture want to write their articles and their bylaws in such a way as to impose upon themselves that requirement, that is just fine. It is suitable for some industries. In some industries, anything that is more than 3 or 4 years old can safely be ignored because the technology changes so fast. That is true in com-

puters; it is true in large-scale integrated circuits, by and large. And unfortunately, these are the industries from which the suggestion to mandate licensing after a limited number of years is coming. But why the people in those industries should be trying to form a procrustean bed into which the chemical industry and the drug industry and the machine tool industry must fit, when it does not fit their circumstances, is absolutely beyond me.

So I urge the committee in the strongest possible terms: Do not write mandatory licensing into this joint venture provision. There is nothing to prevent parties for whom it is appropriate from writing it into their own articles of organization, but it would make the vehicle totally useless to many of our industries that have longer payoff periods. In the drug industry, for example, one rarely is able to bring a product onto the market in less than 7 or 8 years by the time one gets through with efficacy and safety testing at FDA, just to take one example.

I think that really concludes the points I wanted to make this morning, Congressman Lungren. I would be happy to answer any questions.

[The prepared statement of Mr. Baxter, together with the statement presented to the Senate Committee on the Judiciary, follows:]

Prepared Statement of William F. Baxter

I appreciate the opportunity to discuss with the Committee the need for legislation to stimulate joint R&D ventures. The Administration has recently developed a package of reforms, entitled the National Productivity and Innovation Act, which is designed to increase the incentives for private sector R&D of all kinds. I have testified on the Administration's proposal before the Judiciary Committees of both Houses of Congress, and I am providing the members of this Committee with copies of the prepared statement that I presented to the Senate Judiciary Committee last week. That statement describes in detail the Department's views in this area. I would like to focus briefly on three points in my prepared remarks today: the need for reform to remove antitrust impediments to joint R&D; the greater need for reform to remove impediments to the licensing of technology; and the importance of assuring that the reforms implemented by Congress preserve procompetitive flexibility in the design and carrying out of joint R&D.

I understand that the primary purpose of this hearing is to determine whether the antitrust laws should be amended to stimulate joint R&D. The short answer is yes; however, the need for reform arises more from perceptions, or misperceptions, than from the actual state of the law. The problem is the lack of case law concerning the treatment of joint R&D ventures under the antitrust laws.

There are some precedents involving non-R&D joint ventures that can be read as applying a per se prohibition against joint ventures. 1/ Those precedents are rather old. Moreover, other decisions dealing with R&D evince judicial sympathy toward collaborative R&D efforts. 2/ In the only recent case involving the antitrust legality of a joint R&D venture, the court held that the legality of joint R&D ventures was to be judged under a rule of reason and not a per se rule. 3/ In addition, we at the Department of Justice have taken pains to indicate that the antitrust laws are entirely consistent with procompetitive joint R&D. Nevertheless, notwithstanding the Berkey case (the facts of which are admittedly unique) and the Department's efforts, there is little precedent to assure businessmen and their lawyers that the courts will not condemn joint R&D ventures out of hand.

It has been my experience that businessmen judge this lack of precedent--and the uncertainty that it creates--as a significant risk to the formation of joint R&D ventures.

1/ See Timken Roller Bearing Co. v. United States, 341 U.S. 593, 598 (1951); United States v. Minnesota Mining & Mfg. Co., 92 F. Supp. 947 (D. Mass. 1950).

2/ See, e.g., United States v. Line Material Co., 333 U.S. 287, 310 (1948).

3/ Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263, 298-304 (2d Cir. 1979), cert. denied, 444 U.S. 1093 (1980) (the case involved an agreement to develop the "magicube" and the "flipflash").

Businessmen fear that after making a substantial investment in a joint R&D venture they will be sued by a disgruntled competitor who was not included in the joint venture. And this risk increases as the success of the joint venture increases.

Moreover, the automatic availability of treble damages exacerbates the risk facing potential joint ventures. Under the antitrust laws, a defendant that is found to have committed a violation is automatically subject to three times the antitrust damage it causes. Not only do treble damages unduly magnify the risk that a court will condemn a procompetitive joint venture, but they also increase the incentives for challenges to a joint R&D venture in the hope of convincing a court that the venture itself or some aspect of it is a per se violation of the antitrust laws.

As a result of this risk, which overly cautious counsel at times overestimate, it appears that some businessmen have refrained from forming joint R&D ventures that would have been procompetitive. There is no way to determine the number of such ventures that have been deterred, but I am convinced that it is large enough to justify legislation.

One must keep in mine that technological changes have made collaborative R&D increasingly important. As the cost and sophistication of R&D grow, the economies that can be obtained from large scale R&D also tend to grow. As a result, it is likely that joint ventures will become increasingly important

to the efficient performance of R&D. Therefore, whatever the magnitude of the adverse deterrent effect of the antitrust risk on joint R&D in the past, it is likely to become even more significant in the future.

While legislation is appropriate to reduce the legal risk facing those considering the formation of joint R&D ventures, I believe that it is even more important to reduce the legal risks that attend the dissemination of new technologies once they have been created. Although joint R&D is becoming increasingly important, it is still the case that a great deal of private sector R&D will not be performed collaboratively even if the law is changed. Moreover, the incentives to make the necessary investment in any sort of R&D depend on the rewards that one can expect from that investment. Those rewards depend on the efficiency and speed with which the resulting technology can be exploited commercially. Similarly, the benefits that society can expect from the technology depend on the owner's ability to disseminate technology. Licensing and the ancillary restrictions frequently used in licensing enable the owners of intellectual property (e.g., patents, copyrights, and trade secrets) to employ the superior ability of other enterprises to develop and market technology more quickly and efficiently. It is therefore crucial that the courts and enforcement agencies be sensitive to the procompetitive benefits of such licensing.

Unfortunately, the courts and the enforcement agencies have all too often been unreasonably hostile to technology licensing. This hostility toward licensing has created not only perceived but also very real risks for those who engage in such licensing. In antitrust cases, the Supreme Court has depicted the patent system as inherently in conflict with antitrust goals and has placed restraints on the ability of patent owners to use their patents in order to avoid the "evils of an expansion of the patent monopoly by private engagements." 4/ One lower court recently stated that the patent grant "is in inevitable tension with the general hostility against monopoly expressed in the antitrust laws. . . . Therefore, courts normally construe patent rights narrowly in deference to the public interest in competition." 5/ While it is not semantically incorrect to characterize patents as "monopolies," it is improper to condemn them automatically as economic monopolies. 6/ Moreover,

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4/ Mercoid Corp. v. Mid-Continent Co., 320 U.S. 661, 665 (1944). See also United States v. Line Material, Inc., 333 U.S. 287 (1948); Ethyl Corp. v. United States, 309 U.S. 436 (1940); Carbice Corp. v. American Patent Development Co., 283 U.S. 27 (1931).

5/ United States v. Studiengesellschaft Kohle, m.b.H., 670 F.2d 1122, 1127 (D.C. Cir. 1981).

6/ See Baxter, "Antitrust Law and the Stimulation of Technological Invention and Innovation," unpublished discussion paper (July 1983), at pp. 37-40.

this hostility has led to the development by the courts of antitrust rules applicable to intellectual property licensing that have inhibited the procompetitive dissemination of technology.

The courts have not been alone in unnecessarily increasing the legal risks associated with intellectual property licensing. During the last decade, the federal antitrust enforcement agencies, particularly the Department of Justice, embraced enforcement policies that were unduly hostile towards intellectual property. Those policies indiscriminately condemned nine licensing practices (the "nine no-nos") as per se violations of the antitrust laws.

The courts and enforcement agencies have begun to take a more rational approach under the antitrust laws to intellectual property licensing. However, this avenue of change is slow, and a substantial risk of unreasoning judicial hostility remains. As with joint R&D, this risk is unnecessarily compounded by automatic treble damages. Some procompetitive licensing therefore surely continues to be deterred, and this adverse legal climate continues to reduce the willingness and ability of the private sector to invest in R&D and to disseminate the fruits of R&D.

The patent and copyright doctrines of misuse also deter procompetitive licensing. Under those doctrines the courts refuse to enforce the valid intellectual property rights of

those who have engaged in "misuse." The term misuse was originally synonymous with licensing practices that violated the antitrust laws. However, over time the courts began to employ per se misuse rules even more rigid than those employed under the antitrust laws. 7/ Moreover, the courts began to employ misuse to invalidate intellectual property on the basis of vague notions of what seemed "unfair" to them. Relying on the misuse doctrine, the courts have even condemned royalties that the judge found to be exorbitant and oppressive. 8/

Because the courts have used the antitrust laws and the misuse doctrines in a way that has intolerably raised the risks for licensing technology, it is essential that antitrust reform designed to remove impediments to private sector R&D address these problems. Dealing exclusively with the relationship of the antitrust laws to joint R&D will not do even half the job. Congress should seize the opportunity provided by its bipartisan recognition of the importance of R&D to a strong economy and do the entire job.

7/ See Baxter, supra n. 7, at nn. 71-74 for examples.

8/ American Photocopy Equipment Co. v. Rovico, Inc., 359 F.2d 745 (7th Cir. 1966). See also Remarks of Roger B. Andewelt before the Patent, Trademark and Copyright Section of the Bar Association for the District of Columbia, "Competition Policy and the Patent Misuse Doctrine" (November 3, 1982), for a detailed description of the misuse doctrine and its development.

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However, in doing the job, Congress should be careful only to remove the obstacles currently impeding the private sector's willingness and ability to perform R&D and to disseminate its fruits. Many of bills pending in the Congress do not simply remove the obstacles but rather replace them with other obstacles. As I pointed out in my testimony before the Senate Judiciary Committee, those proposed solutions to the joint R&D problem that depend on government regulation and/or new statutory standards will raise the cost of joint R&D, discourage some procompetitive joint R&D, and encourage some anticompetitive joint R&D.

Congress should not attempt to out-guess the market as to the structure that joint R&D ventures should take. So long as a venture will not harm competition, it should be allowed to take the most efficient form its participants can devise. If, however, the venture either facilitates collusion on current output and prices or reduces the incentives to innovate, it is inappropriate to provide the venture with legal sanctuary from antitrust condemnation. The National Productivity and Innovation Act is designed to facilitate the functioning of the market in the least intrusive manner possible. That bill merely reduces the legal risk that the private sector now faces when performing R&D and exploiting technology. Private enterprise responding to market forces, not government bureaucrats, will be free to determine the most efficient way to innovate in the myriad of circumstances that will arise throughout our economy.

That concludes my prepared remarks Mr. Chairman. I will be happy to answer any questions the Committee may have.

Department of Justice

STATEMENT OF

WILLIAM F. BAXTER
ASSISTANT ATTORNEY GENERAL
ANTITRUST DIVISION

BEFORE THE

COMMITTEE ON THE JUDICIARY
UNITED STATES SENATE

CONCERNING

THE NATIONAL PRODUCTIVITY AND INNOVATION ACT OF 1983
S. 1841

OCTOBER 26, 1983

Mr. Chairman and members of the Committee:

I appreciate very much the opportunity to appear before the Committee to discuss proposals that would enhance American innovation, productivity, and efficiency in an increasingly competitive world. If this nation is to maintain its longstanding position of economic leadership, we must assure that American industry has the ability and incentive to keep pace with our overseas trading partners.

To these ends, the Administration has undertaken an extensive review of federal antitrust and intellectual property law and has devised a package of high priority reforms that should markedly improve the ability of the private sector to develop and market new technology. My remarks today will focus on the Administration's proposal, the National Productivity and Innovation Act of 1983, which you, Mr. Chairman, introduced as S. 1841. It is a bill that I hope will receive widespread support and early action.

Several other proposals regarding the application of the antitrust laws to joint R&D have been put before the Congress. S. 1841 contains some of the better features of these proposals and is, I believe, the best approach to the perception--I should say misperception--that the antitrust laws are somehow inconsistent with procompetitive joint R&D. But unlike most of the other proposals, S. 1841 does not stop short after addressing only joint R&D. It recognizes that industry's

incentive to invest in R&D and its ability efficiently to apply new technology depend heavily on the laws that protect inventions and affect the marketing of those inventions. The National Productivity and Innovation Act of 1983 makes necessary reforms in those laws as well.

It is difficult to overstate the importance of new technology in today's economy. Like the industrial revolution of the last century, today's "technological revolution" is making profound changes in the way society provides the goods and services that its citizens demand. These changes are the hallmark of a healthy and growing economy. New technology increases the quantity, quality, and variety of goods and services available to satisfy the needs of consumers. New technology also enables society to produce goods and services far more efficiently--that is, using fewer of its increasingly scarce resources. By increasing efficiency and reducing costs, advances in technology increase productivity and reduce inflationary pressures. Technological growth thus plays a key role in improving the quality of life and in preserving the ability of American industry to stay competitive in international markets.

The development of new technology is an economically-risky undertaking. In recent years, R&D has become increasingly sophisticated and costly. And there is no guarantee that investment in costly research will result in profitable new

technology. We all have heard of the spectacular breakthroughs that earn fortunes for their inventors. However, at times, R&D effort yields nothing that is commercially useful. Even more frequently R&D results only in minor technological improvements that are individually only marginally profitable, even though cumulatively they are essential to improving this nation's efficiency.

Because the essence of technology is information, and because it is difficult to prevent others from using information once it is created, even the creators of spectacular technological breakthroughs may be unable to earn a substantial return on their investment in R&D. "Free-riders" rather than the creators of technology are often able to appropriate the bulk of the economic benefits that result from the technology.

To overcome these problems of risk and free-riders, the United States and other countries have established the various regimes of intellectual property, which grant to the creators of new technology exclusive rights in their inventions. Intellectual property rights provide a market solution that enables inventors and innovators to obtain rewards for their R&D efforts that reflect the benefits that their efforts confer on society.

After a successful technology is created and provided with some form of intellectual property protection, the technology still must be commercially developed and applied before the

inventor can earn his reward and society can realize the full benefits of that technology. Intellectual property laws also serve this end. They provide a legally-defined "commodity" that can be bought and sold in free markets. As a result, through contractual arrangements, an inventor can combine his intellectual property with the development, manufacturing, and distributional skills of others to bring goods and services that embody the new technology to the marketplace more quickly and at lower cost than otherwise would be possible.

The antitrust laws also have an important effect on the private sector's willingness and ability to create, develop and market new technologies. Vigorous competition to obtain profits is the factor that distinguishes our economic system, and the antitrust laws are the body of law that promotes and protects competition in the marketplace. Competition among the purchasers and sellers of goods and services generally assures efficient production, high quality and low prices. Similarly, competition in the area of R&D spurs market participants to create and develop new technologies that will give them an advantage over their competitors.

Cooperation among competitors, however, does not always violate the antitrust laws. While the antitrust laws are premised on the notion that a free economy is best served by vigorous competition, those laws are sensitive to the fact that, in some areas, cooperation among independent entities,

even among competitors, may be fully consistent with competition and in fact necessary to maximize the well-being of consumers. The creation and development of technology is one very important area in which such cooperation frequently may be beneficial.

The antitrust laws also directly affect the rewards that creators of new technology may expect and the extent, speed and efficiency with which that technology is disseminated throughout the economy. The sale and licensing of technology are subject to antitrust principles, and it is the ability of the owners of technology to engage in such sale and licensing that determines the extent to which the benefits of the new technology will be developed and disseminated. Unfortunately, courts and commentators occasionally have described the antitrust and intellectual property laws as being at odds with one another. As a consequence, the courts have interpreted the antitrust laws in a way that unduly restricts the sale and licensing of technology.

This interpretation is unfortunate. Both the antitrust and intellectual property laws are designed to foster competition and to create the free-market incentives that have produced virtually everything we Americans enjoy today. So long as the sale or licensing of intellectual property does not unduly restrict competition, the freedom of its owners to choose the most efficient and effective means to develop new technologies should not be impeded.

After a review of the antitrust and intellectual property laws, the Administration has concluded that a small number of important improvements in those laws could greatly enhance their ability to foster technological growth. The National Productivity and Innovation Act of 1983 embodies these improvements. The Act contains four substantive titles. The improvements it makes to the antitrust laws relate to joint R&D and the licensing of intellectual property. The improvements it makes to the patent and copyright laws clarify and enhance patent and copyright protection and assure that process patent holders are protected against infringement by unauthorized foreign imports.

Title II of the Act concerns the application of the antitrust laws to joint R&D. Many types of R&D have become increasingly complex and sophisticated and therefore increasingly expensive. In some contexts, advances in technology in turn have increased the advantages of large-scale R&D efforts. And it is possible that in some markets no single firm is individually capable of performing a particular type of R&D. Cooperation therefore has become an important avenue for conducting R&D efficiently, and so for enhancing American productivity and competitiveness. Properly interpreted, the antitrust laws act only to prohibit anticompetitive joint R&D; they do not proscribe those ventures, no matter how large, that are necessary to the efficient performance of R&D.

There is a perception, however, that the antitrust laws discourage joint R&D efforts, regardless of their benefits. There is virtually no case law dealing directly with the relationship between the antitrust laws and joint R&D. There are, however, a few older decisions that can be read as condemning, more or less out-of-hand, non-R&D joint ventures between competitors. This and the fact that treble damages are automatic in antitrust cases have led to conservative antitrust advice and decision-making with respect to joint R&D. Firms fear that after investing large amounts of capital in a venture, they may be faced with the threat of a treble-damage suit by a disgruntled competitor who has been excluded from the venture. And, of course, the risk of such a suit increases in direct proportion to the economic success of a joint R&D venture.

Title II of the National Productivity and Innovation Act is the best approach to alleviating the antitrust risk faced by joint R&D ventures. That title first makes it absolutely clear that joint R&D ventures are not to be deemed illegal per se in actions under the antitrust laws. This would prohibit the courts from condemning joint R&D ventures without first considering their potential benefits. The fact that the courts must apply a "rule of reason" analysis to joint R&D does not mean, of course, that in every case the court must sift through and account for every idiosyncracy of the given arrangement and

its surrounding circumstances. Rather, the courts should develop rules or presumptions based on economic learning and experience.

Although joint R&D ventures are usually procompetitive, such ventures can have two different anticompetitive effects. First, a joint R&D venture can serve as a device through which competitors can coordinate prices and output on current production in some market other than the R&D market. Traditional methods of antitrust analysis, with some modification, can detect this possibility, which will turn on factors that include concentration in the relevant market, the market share of the joint venture, the nature of research (applied or basic), and the extent to which information on current prices, cost and/or output is exchanged among the members.

Second, a joint R&D venture, if overinclusive, may have adverse effects on the incentives to innovate. Rivalry in R&D, like rivalry in the sale and purchase of goods and services, is important. A joint R&D venture can reduce the incentives to innovate if the joint venture includes too large a percentage of the market composed of all firms capable, individually or cooperatively, of undertaking the same or similar R&D. So long as there is a sufficient number of R&D competitors outside the venture to form a competitively significant number of other R&D projects of a similar capability--perhaps five--the joint R&D venture would, in all likelihood, have no adverse effect in the

R&D market and should not violate the antitrust laws. Courts should not automatically condemn larger R&D ventures but should determine whether economies of scale or scope or other efficiencies justify their greater inclusiveness.

In analyzing the inclusiveness of an R&D venture, one must be realistic about the R&D market. It is safe to say that the R&D market will often (but not invariably) be international in scope. Technology that results from R&D conducted in another country can usually be licensed in the United States, even if products embodying the technology made in that country could not be sold competitively here because of import barriers or transportation costs.

Simply clarifying the antitrust rules that apply to joint R&D will not be sufficient to reduce the antitrust risks that currently may be inhibiting the formation of procompetitive joint ventures. Title II therefore goes further and also provides that participants in a joint R&D venture that has been fully disclosed to the Justice Department and the Federal Trade Commission would be liable for no more than any actual antitrust injury caused by the venture, plus interest from the date suit is filed. Joint venture participants could request confidential treatment of commercially-sensitive information included in their disclosure.

Title II contains no new regulatory scheme, no requirement for formal certification. Title II provides straightforward protection to all R&D aspects of a joint venture; any other

activities of the joint venture would continue to be subject to current antitrust rules. And Title II preserves an adequate antitrust safeguard with respect to joint R&D itself; any anticompetitive activity could still be challenged. In short, Title II would eliminate the deterrent effect that legal uncertainty, combined with treble damages, may now be having on joint R&D, while preserving competitive incentives to search for new technology.

Most of the other legislative proposals in this area stop short with some equivalent of Title II. More must be done. Removing a perceived deterrent to joint R&D is certainly important, but we must also increase industry's basic incentive to commit resources to R&D. The National Productivity and Innovation Act does just that, and thus goes much further towards assuring a legal climate that is conducive to the creation, development, and commercial exploitation of new technology.

Title III of the National Productivity and Innovation Act encourages innovation by assuring that intellectual property licensing is treated reasonably under the antitrust laws and by eliminating the threat of treble damages based on such licensing. The antitrust laws must be sensitive to the procompetitive benefits that the licensing of intellectual property can achieve. Licensing and the ancillary restrictions frequently used in licensing enable intellectual property

owners to employ the superior ability of other enterprises to develop and market technology more quickly and efficiently. For example, an intellectual property owner can use licensing restrictions to induce others to develop new technology in fields of use that the owner might otherwise be unable to exploit.

It is crucial that the courts carefully consider procompetitive benefits when evaluating the lawfulness of intellectual property licensing under the antitrust laws. While many courts appreciate the competitive benefits of intellectual property and its licensing, others seem to have viewed a system of exclusive rights that enables the inventor or innovator to enjoy the fruits of his labor as somehow inconsistent with the antitrust laws. Title III would alleviate the hostility occasionally shown toward intellectual property in the context of antitrust suits by expressly prohibiting the courts from condemning intellectual property licensing as illegal per se. Before a court could find that a particular agreement, or a particular restriction in an agreement, conveying rights to use intellectual property violates the antitrust laws, it would have to consider the agreement's procompetitive benefits.

Title III also provides that the licensing of intellectual property will not subject its owners to possible treble-damage liability. The threat of treble-damage liability is a strong

deterrent to firms engaging in conduct that bears some risk of being held to violate the antitrust laws. Where the conduct is clearly anticompetitive, as in the case of price fixing among competitors, such deterrence is appropriate. However, where the conduct may very well be procompetitive, as is the case with intellectual property licensing, the availability of punitive damage remedies is unfair and counterproductive. Moreover, because licensees are generally the plaintiffs in antitrust suits challenging intellectual property licensing practices and because licensees obviously will be aware of potentially anticompetitive restrictions, the award of treble damages is not necessary to induce "private attorneys general" to root out anticompetitive licenses. Title III therefore provides that liability under the antitrust laws in cases based on the licensing of intellectual property will be limited to any actual antitrust injury caused by the challenged conduct, plus interest from the date suit is filed. The deterrent of treble damages would be eliminated, but adequate compensatory remedies would be preserved. In sum, Title III sends a clear message that intellectual property enhances rather than impedes innovation and productivity, and that antitrust enforcement must be appropriately sensitive to this fact.

Title IV of the National Productivity and Innovation Act also concerns the exploitation of intellectual property, but involves amendments to the patent and copyright laws rather

than the antitrust laws. Courts occasionally have employed the judicially-created doctrines of patent and copyright misuse to justify a refusal to enforce a valid patent or copyright against infringement. The equitable doctrine of misuse was originally developed by the courts to deny legal protection to intellectual property until that property was purged of any taint that resulted from its use by the owner in an anticompetitive manner. The notion was that by using the property anticompetitively an intellectual property owner was able to extend his exclusive rights beyond what the law allowed and so was able to earn more from his property than that to which he was entitled under the law.

Over time the doctrine of misuse began to drift away from its original intent. Judges began to use the doctrine to refuse to enforce otherwise valid patents on the basis of vague notions of what seemed "unfair" to them. Conduct was deemed to be misuse without the rigorous economic analysis that should be employed under the antitrust laws to determine whether particular conduct is harmful. As a consequence, the courts have sometimes condemned beneficial conduct that maximizes the rewards to which patentees and copyright holders are legitimately entitled.

Title IV is designed to eliminate the divergence between the misuse doctrine and the sound economic analysis that identifies truly anticompetitive behavior. It does so by

precluding courts from classifying conduct as patent or copyright misuse on competitive grounds unless such conduct violates the antitrust laws.

Title V of the National Productivity and Innovation Act closes a loophole in the U.S. patent laws that has impaired the ability of process patent holders to earn their rightful reward and so reduced incentives to create and develop new and more efficient ways to produce the goods society needs. In addition, this loophole has created a perverse incentive for U.S. firms to manufacture products outside this country using foreign labor.

Process patents are of particular importance to increasing the productivity of labor and the ability of our industries to compete in transnational markets. Process patents generally are granted for new uses of existing goods or for new ways to produce existing goods. They are particularly important in increasing the efficiency of industry and in enabling U.S. firms to manufacture products at minimum cost.

Under current law, the owner of a patent covering a process has significantly less protection against the unauthorized use of his invention than the owner of a patent covering a product. Where a product patent is involved, a firm cannot avoid infringement by manufacturing the product overseas and then importing it into the United States, because the use or sale of the product in the United States would infringe the

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U.S. product patent. Where a process patent is involved, however, there is often no effective means by which a patentee can prevent a firm from practicing the process patent overseas and then selling the product made by that process in the United States. Unlike the patent laws of most of our trading partners, U.S. patent law does not condemn this conduct as an infringement of the process patent. This loophole not only discourages firms from investing in R&D aimed at discovering new and better processes, but it also encourages firms to manufacture overseas with foreign labor when a U.S. process patent is involved.

Title V is directed at eliminating both of these undesired effects by classifying the use or sale in the United States of a product made by a process covered by a U.S. patent as an infringement of the process patent, regardless of where in the world the patent is practiced.

Taken as a whole, the reforms contained in the National Productivity and Innovation Act will significantly improve the legal climate for R&D. The Act will eliminate a perceived deterrent to R&D and increase industry's incentive to invest in these crucial efforts.

The National Productivity and Innovation Act is the best of the currently pending legislation that is designed to improve the legal climate for private sector R&D. Basically, the bill has two substantial advantages over the competing bills. First

and foremost, the National Productivity and Innovation Act does much more to enable the private sector to create, develop and market new technologies. Unlike the other bills that only deal with the issue of joint R&D, the Act goes much further to increase the incentives throughout the economy to engage in all types of R&D.

In fact, I believe the reforms that remove the restraints on intellectual property licensing and that increase the protection for process patents will have a more profound and positive effect on private sector R&D. A focus on joint R&D is far too narrow. While in some industries collaborative R&D may be important to enable the participants to expand the frontiers of technology, in most industries firms perform R&D alone. Yet it is essential that there be adequate incentives for R&D of all types.

Moreover, R&D is worth very little to society if it cannot be translated into better, cheaper goods and services. The National Productivity and Innovation Act provides benefits economy-wide by dealing with the incentives for all types of R&D and by improving the ability of the owners of technology efficiently to develop and fully to disseminate their technology after it is created.

In addition, the inhibiting effect that the antitrust laws and the misuse doctrines currently have on procompetitive licensing hits small businesses particularly hard. Small

businesses and individuals are the source of countless inventions and innovations that promise to benefit society. Unlike their large corporate counterparts, however, small firms are often unable fully to exploit technologies by themselves; they must license. Overly restrictive application of the antitrust laws imposes additional costs on such businesses and may put them at an unnecessary competitive disadvantage with respect to their larger competitors.

In addition, small businesses often may be in the best position to develop particular applications of a new technology. It is likely, however, that some of those businesses are deprived of access to technology because of the antitrust risks that may deter the technology's owner from licensing. Small businesses therefore are likely to be the recipients of many of the licensing opportunities that will be created by S. 1841.

Second, the approach that the National Productivity and Innovation Act takes specifically with respect to joint R&D is superior to the approach of most of the other bills. Some of the other proposals seek to alleviate the deterrent effect of the antitrust laws on joint R&D ventures by requiring government certification, which is tantamount to regulation, of all joint R&D ventures. Such certification would require some government agency--most likely the Department of Justice--to expend a great deal of resources investigating joint ventures

that otherwise would never have raised a concern. It would unnecessarily increase the cost of forming and operating joint R&D ventures. Moreover, to some extent, a certification requirement would make the government an unwilling and uninvited partner in all joint R&D.

A number of bills are inferior because they would grant antitrust immunity to joint R&D ventures that comply with certain standards, which tend to be wooden and arbitrary. None of the standards that have been proposed would be as effective as the current antitrust standard in distinguishing procompetitive ventures from anticompetitive ones. In fact, many of the proposed substitute standards could encourage anticompetitive joint R&D ventures and could inhibit many desirable ones.

The support for new standards or for a statutory safe-harbor generally reflects industry's desire for greater certainty in deciding whether and how to form joint R&D ventures. The Department of Justice shares that desire. At the same time, however, we believe that it will be extremely difficult to draft statutory standards or a safe-harbor that is sufficiently flexible. The standards should allow joint R&D ventures to adopt the most efficient stru ture and should also proscribe anticompetitive conduct in the myriad of circumstances which conceivably might surround a joint venture. While I seriously doubt that statutory language can

be drafted to provide such standards, the Committee's Report could provide a great deal more certainty by explaining in detail the antitrust standard to be applied to joint R&D.

The most egregious standards I have seen provide competitors who otherwise would not be invited to participate in a joint venture with mandatory access to all joint R&D ventures and/or to the technology they create. Such mandatory access or licensing would reduce the incentive to engage in R&D in the first place. Without the reward that exclusive property rights enable intellectual property owners to earn, it is likely that the private sector would invest far less in R&D than it currently does.

The supporters of compulsory licensing generally speak in idealistic terms of the need to disseminate technology. They also contend that requiring compulsory licensing after but a few years will not harm the incentives to invest in R&D. This argument is given an aura of credibility by the fact that the most vocal advocates also ardently support the concept of antitrust immunity for joint R&D. However, those supporters are in industries where technology is generally obsolete within a few years and where it has not been necessary to rely on the 17-year grant of exclusivity provided by the patent system. In most industries the elimination of many years of exclusivity would be disastrous. And R&D legislation should not discriminate against practically all U.S. industries in order to provide a special immunity for a few.

The rationale for compulsory licensing is to assure that technology will be fully disseminated throughout the economy and that small businesses will have access to technology. However, it is not difficult to understand that to the extent such dissemination erodes or destroys the incentive to invest in R&D in the first place, there eventually will be little, if any, technology to disseminate. It makes far better sense to encourage dissemination of technology in a way that does not harm the incentives for R&D. The third and fourth titles of the National Productivity and Innovation Act do precisely that. Not only will those reforms increase the willingness and ability of intellectual property owners to disseminate technologies, but the reforms also will <u>increase</u> the incentive to invest in R&D.

The Administration is anxious to work with this Committee and with the Congress toward the prompt enactment of this timely and important legislation.

Mr. Chairman, that concludes my prepared statement. I will be happy to address any questions you or the other members of the Committee may have.

Representative LUNGREN. Thank you, Mr. Baxter. I know that you are familiar with the Department of Justice antitrust guide concerning research joint ventures. Just for the record, is this guide still in effect as a statement of official policy?

Mr. BAXTER. For the most part I think it is an acceptable statement. It was written before I got here, and at several places I would reword it if we had the time to rework it. But in general, I think it is a satisfactory statement.

Representative LUNGREN. Some might suggest that since we have that guide in place, legislation is really not necessary. But let me just refer you to the preface of that document and the last paragraph. It says:

> This guide is intended as a general statement of enforcement policy for use by business decisionmakers, lawyers, and others. Changes in enforcement policy will no doubt occur over time. Because these changes will not always be simultaneously accompanied by changes to the guide, the positions stated in the guide should not be regarded as barring any action believed appropriate under the antitrust laws.

Now, I am an attorney, and I know about hedging and weasel words and so forth, but it just strikes me that if I were a business person looking at that, it would not give me much comfort. How would it strike you?

Mr. BAXTER. I fully agree with your point. All one can say about those kinds of weasel hedges is that the guide reflects the excessive caution of lawyers and bureaucrats. And when you get bureaucratic lawyers, you have an extreme case of the phenomenon.

Representative LUNGREN. But as a private enterprise attorney trying to give some guidance to a group of businessmen and women who were considering a joint venture, it would strike me that you would be somewhat duty-bound to pay attention to those cautionary words.

Mr. BAXTER. Yes, of course you are. On the other hand, the appropriate response is that, to the extent the Division does change its institutional mind with the passage of time, that fact is widely known. The policy changes are announced so that at least lawyers who are following antitrust activities in general are pretty well informed as to where they stand.

And finally, of course, there is the business review process which can be utilized. Of course, many of the joint ventures have taken advantage of them, and the Department is willing wherever it can to give the current expression of its likely enforcement views in response to a request for a business review.

Now, of course, the business review letter itself contains a certain amount of that kind of hedging with respect to the future. And I think that some amount of hedging is probably unavoidable because, after all, circumstances and industries do change with the passage of time, and what looks perfectly benign in 1970 may look very, very harmful in 1980, so that some flexibility has to be maintained by the enforcement authorities. And I venture to say if you sat down to write a statute, somewhere in that statute fairly general language would appear that would be subject to interpretation and reinterpretation with the passage of time.

One cannot achieve perfect certainty in this world. Businessmen understand that fact. Indeed, that is why capital is compensated, for the risks that it faces, and that is one of the risks.

But I quite agree that the particular hedging that you just alluded to in the guide in excessive in its tone, if not in its reality.

Represenative LUNGREN. I was not trying tc criticize the author of that passage, but just suggesting that even good-faith efforts by the Department of Justice to clarify a situation that needs legislative clarification is obviously going to be inadequate.

Mr. BAXTER. I am not sure I really agree with that. What I mean to suggest is that legislative clarification is itself bounded in its possibilities. And it is not very clear to me the constraints on the Department's ability to clarify are more confining than the restraints on legislative ability.

Of course, unlike the Department, the legislative can achieve certainty, but only at the price of arbitrariness and running the risk of creating rigid structures which will soon become inappropriate in the fact of industrial change.

Representative LUNGREN. In July of this year, you presented a discussion paper on antitrust policy and technology at the University of San Diego conference. I take it that I can take that section on joint R&D ventures as an expression of policy of the Antitrust Division.

Mr. BAXTER. I am sure you can.

Representative LUNGREN. The reason I do this is I want to enter that into the record as an expression of that policy without having to require you to go through everything you went through there.

Mr. BAXTER. I would be happy to have you do that.

[The discussion paper follows:]

ANTITRUST LAW AND THE STIMULATION OF TECHNOLOGICAL INVENTION AND INNOVATION

WILLIAM F. BAXTER */

While it is clear that the United States economy remains a large and productive one, it is equally clear that the economies of some other countries are growing more rapidly and that United States industry is facing increasingly intense competition in international markets. In some low technology industries, such as carbon steel manufacture, comparative advantage has migrated from this country to lesser developed nations. Even in technology-intensive industries, such as semiconductors, where the United States still enjoys a significantly favorable balance of trade, the other major, non-Communist economies are challenging the United States. While United States productivity and competitiveness have appeared to stagnate, the productivity and competitiveness of two of our major trading partners, Japan and West Germany, have improved markedly. 1/

The reasons for the relative decline in this country's competitiveness are myriad and complex. In part, the decline was inevitable. With the exception of Canada, the United States was the only major industrialized country that survived World War II with its industrial base intact. Moreover, it is generally easier to copy and catch up than to develop new technologies and to maintain an unnaturally large competitive advantage.

In part, unwise governmental policies have exacerbated this inevitable decline. The United States economy has been "overregulated." A significant portion of those regulations promulgated in the last two decades simply is not cost-justified. In addition, the public sector has absorbed increasingly larger portions of national income, diverting resouces that the private sector could have used to increase productivity. Similarly, tax policy has stimulated consumption at the expense of saving and investment. Moreover, this country's monetary policy has fueled high inflation, which also acts as a disincentive to long term investments that can improve efficiency. Although inflation now appears to be under control, the failure to control public sector spending has caused inflationary expectations to remain high and has led to extraordinarily high real interest rates. Not only have high real rates made many investments too expensive, but they also have led to extremely unfavorable exchange rates that have exacerbated this country's trade deficits.

Many commentators have also charged that this country's antitrust laws are one source of the decline in the rate of productivity growth. 2/ The antitrust laws, according to these charges, inhibit, if not proscribe, market arrangements that are necessary to improve this country's competitiveness in world markets. The criticism usually focuses on the adverse

deterrent effect the antitrust laws are supposed to have on joint research and development ("R&D") ventures. 3/ According to the argument, potential joint venturers fear that even the most innocuous joint venture may be subjected to antitrust proscription. Claiming that our major trading partners do not suffer under a similar antitrust handicap, these critics charge that United States industry, deterred from entering into joint R&D, is unable to compete effectively in the creation of new technology.

On the one hand, this argument is both an over-simplification and an overstatement of the effect that the United States' antitrust laws have on the process of R&D. The antitrust laws themselves are not hostile to behavior that enhances efficiency. On the other hand, it is true that excessive antitrust remedies and judicial interpretation of the antitrust laws, especially as they relate to intellectual property, have inhibited procompetitive joint ventures in particular and productivity in general. The optimal solution is not, however, to eliminate or to alter drastically the substantive antitrust statutes. Rather, a few minor modifications of the antitrust and intellectual property statutes would alleviate the problem, while enabling the antitrust laws to continue to assure that anticompetitive market activities are not allowed to harm consumer welfare.

This paper examines the relationship between the antitrust laws and technological innovation. The paper first briefly reviews the nature of the creation and exploitation of technology. The paper then analyzes the effect the antitrust laws have on joint R&D ventures and on the exploitation of the the fruits of R&D, intellectual property. Next, the paper argues that minor alterations in the antitrust laws as they relate to joint R&D and intellectual property licensing and in intellectual property law as it relates to the doctrine of misuse are all that is necessary to remove the legal impediments that currently may inhibit technological growth. The paper concludes by arguing that more drastic solutions to this country's productivity problems, which are grouped under the rubric of "national industrial policy," are unsound and would certainly hinder, rather than help, this nation's effort to improve its productivity.

I. ANTITRUST AND TECHNOLOGY

The antitrust statutes 4/ provide a flexible standard for proscribing those commercial activities that are more likely than not to reduce "consumer welfare"--i.e., allocative and productive efficiency. 5/ Properly interpreted, the antitrust laws condemn only market conduct that has as its purpose or effect the accumulation and exercise of market power, which allows its holders to restrict output and thereby adversely to affect resource allocation. Even then, the conduct should not

be condemned if it is likely to increase productive efficiency to a greater extent than it decreases allocative efficiency. To the extent that the statutes are understood and the antitrust operational rules adhere to the underlying rationale of the statutes, the antitrust laws should not inhibit conduct that increases efficiency, including conduct which relates to the creation and exploitation of technology. However, for reasons that this paper will attempt to describe, this is not always the case.

To understand the relationship of the antitrust laws to the creation and exploitation of technology, it is necessary to understand the special characteristics of technology. The essence of technology is information. This information concerns the production of new goods and services and the more efficient production of existing goods and services. The increase in technological information enables society to utilize its existing resources more efficiently, and the advance of technology therefore increases productivity, competitiveness, and consumer welfare.

Information has special characteristics, and it raises some unique economic problems. 6/ Because antitrust analysis has not always been sensitive to these problems, that analysis has at times been improperly applied to activity that involves the creation and exploitation of technology.

First, the creation and development of technology involves a great deal of risk. 7/ At the time a decision is made to invest in R&D, the expected probability that the R&D will be successful is less than one. The technological information may prove too costly to exploit because of related cost constraints, or the information may be worthless because of insufficient consumer demand for the process, product, or service embodying the new technology. Even if the idea can be commercially exploited, it may only be marginally successful, providing the investor with little more than a normal ex post return on capital invested in production.

Moreover, the risk associated with R&D is relatively difficult to reduce. Because of the enormity of the expense of conducting sophisticated R&D, it is likely that only a few individual firms have sufficient internally generated capital to fund on their own a large enough number of R&D projects to diversify away the risk. High transactions costs also impede the market's ability to reduce the risk. Because of "information impactedness," 8/ an inventor may be unable to convey to the market that his inventive efforts have a higher probability of success than average. 9/ Similarly, third parties may be reluctant to assume the risk associated with R&D either through the purchase of equity or through traditional insurance underwriting because of the difficulty involved in monitoring the inventor's efforts. 10/ It will be difficult to

determine whether a failure was inevitable or whether it was due to a failure of the inventor (who is compensated regardless of success) to use his best efforts. Joint R&D ventures may be the most efficient means of overcoming these problems and so of alleviating the risk.

Second, it is generally not easy for the creator of technology to prevent others from using it freely without his consent. 11/ Once the information is divulged to third parties, they can "free ride" on the technology and can thereby deny the inventor the full fruits of his invention. This free-rider phenomenon often can lead to a wide divergence between the social value of technology and the benefits the inventor is able to appropriate. At the extreme, where there is intense competition and information is instantaneously disseminated, the inventor may appropriate nothing. Of course, if this free-rider phenomenon is not counteracted, there will be a serious underinvestment in the creation of new technology.

Third, technology, once created, has zero marginal cost of use, excluding transactions costs. 12/ The consumption or use of technological information by one person does not reduce the amount that others can consume. 13/ Viewed as of the time technology is created, allocative efficiency is optimized if the technology is available to others at its marginal cost--that is, if it can be freely used by everyone. So long as a single positive price, no matter how low, is charged for

the use of the technology, consumer welfare could be increased if potential consumers who place a lesser, though non-negative, value on its use were allowed to use the technology. However, this analysis fails to recognize that although in the very short run consumer welfare would be maximized if technology were freely available to everyone, the market would as a practical matter cease to produce new technology. In the long run, unless the public sector subsidized R&D, free use of technology would reduce consumer welfare by denying society inventions and innovations that increase productive efficiency. 14/

A nation could deal with the problems associated with the creation and exploitation of technology through government subsidization of R&D, combined with permitting everyone free access to technology. The political mechanism, however, does a poor job of allocating resources, including investment capital, to their most valuable use. 15/ With the exception of basic research, the United States has chosen instead to use a market solution. Our society grants the creator of technology limited exclusive rights to use the fruits of his R&D efforts. These exclusive rights, which are embodied in the various regimes of intellectual property, most prominently patents and copyrights, provide inventors and other innovators with rewards for their R&D efforts that reflect the benefits that their technological creations confer on society. 16/ Moreover, patent law, for

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example, serves to define a "commodity" that can be transacted in the market. 17/ Through licensing arrangements, the inventor can combine his intellectual property with the goods and services of others and bring the technology to the marketplace more quickly and at lower cost than otherwise would be possible.

The antitrust laws should be conducive to the efficient creation and exploitation of technology inasmuch as technology serves in the long run to increase consumer welfare. The judicial interpretation of the antitrust laws generally has been sympathetic to joint R&D arrangements that do not threaten competition and that enhance efficiency. However, by misperceiving the relationship between the antitrust laws and intellectual property, the courts have inhibited the efforts of intellectual property owners to exploit their property in the most efficient manner. In addition to affecting the allocation of society's resources adversely, this judicially-imposed impediment to the commercial exploitation of intellectual property has reduced the returns to R&D and hence has diminished unnecessarily the incentives to create technology.

A. Joint R&D Analysis Under the Antitrust Laws

The antitrust laws and their judicial interpretation have not been overly hostile to joint ventures in general and joint R&D ventures in particular. Although some cases suggest that under certain circumstances joint ventures are per se

violations of the antitrust laws, 18/ the courts are sensitive to the procompetitive potential of joint R&D ventures. 19/ There can be little doubt that a legitimate joint venture designed to achieve efficiencies in R&D would be judged under the rule of reason. 20/ However, the paucity of reported cases may be the cause of the frequent complaints that there is a great deal of uncertainty as to the antitrust analysis applied to joint R&D. This section of the paper attempts to summarize the appropriate analysis, and to explain preliminarily the reasons why antitrust analysis may inhibit joint R&D.

1. The Procompetitive and Anticompetitive Aspects of Joint R&D

Economic theory provides the means for developing rules that can effectively distinguish between procompetitive and anticompetitive joint R&D. Developing such rules involves a trade-off. As joint ventures increase in size, they are likely to realize economies of scale and so to lower average cost per unit of output. However, as the fraction of all potential joint venturers that actually participate in a joint venture increases, there is an increase in the danger that the joint venture will result in the restriction of output both at the R&D level and at the production and marketing level where the participants compete.

Joint R&D ventures can capture significant economies and so can be procompetitive. Increasing the size of the venture spreads the risk and so reduces cost. Joint ventures also can serve as a risk reduction device that can alleviate the transactions costs problems associated with "information impactedness" and "moral hazard." 21/ Because the providers of capital to the joint R&D venture also participate and so monitor the venture's efforts, a greater pool of internally generated capital is made available for R&D.

Joint ventures also may provide the means for capturing other economies of scale and scope. For example, the unit cost of operating very sophisticated scientific machinery used in experiments generally decreases as the number of units increases. Also, by combining the complementary abilities of different competitors within a single venture, a synergistic effect may be created which further lowers the cost of R&D. Not only can the integration of the participants lower transactions costs associated with combining the various assets necessary to conduct the R&D, but increasing the diversity of participants will also increase the likelihood that the joint venture itself will be able to exploit the technology commercially. Without trying to indentify the multitude of reasons that joint ventures can reduce the cost of R&D, it is sufficient to recognize that the economies are not fanciful and generally will increase as the venture's share of the market increases.

On the other hand, joint ventures, even those involving only research and development, can also be anticompetitive, as a result of the overinclusion of competitors. Overinclusive joint R&D ventures can have two anticompetitive effects both of which become progressively more significant as the fraction of the market participating in the venture increases: overinclusive joint R&D ventures can directly increase the likelihood of collusion among competitors at the production and marketing level and such ventures can indirectly have such an effect as a result of the reduction of innovation.

First, although the debate among economists on the issue has not yet been definitively resolved, there appears to be a very significant statistical correlation between high levels of market concentration and the probability of collusion. 22/ The treatment under the antitrust laws of mergers and acquisitions has been premised on that notion. And the Merger Guidelines of the U.S. Department of Justice clearly reflect the importance of that correlation. 23/

This does not mean that joint ventures should be controlled by merger standards. However, joint ventures, even those designed solely to perform research and development, can facilitate collusion at the production and marketing level. 24/ Joint ventures provide an opportunity for continued contact among competitors and for the exchange of cost and sales data.

This opportunity makes it much easier for competitors tacitly to coordinate their price and output levels. To the extent that a joint venture has the effect of reducing the number of independent decisions concerning price and output in the market, it can have an anticompetitive potential that is similar to that of a merger.

All other things being equal, however, a joint venture between competitors may be less anticompetitive than an outright merger between the same competitors because typically joint ventures involve asset mergers that have limited scope and duration. Research and development joint ventures, for example, generally involve the contribution by the participants of less than all their assets. In fact the joint venture often does not even require the participants to contribute all of their assets devoted to research and development. The participants' assets that are not contributed to the venture remain independent and in competition with one another. Furthermore, if the focus of the joint venture is not on production or marketing, the danger that it will facilitate collusion on price and output diminishes. In research and development joint ventures, there is little, if any, need to exchange sensitive cost and sales data. And the subject of the research and development often may constitute a very small fraction of the inputs of the final product, for the sales of which the participants compete. 25/

A very good argument therefore can be made that because these various factors mitigate the direct danger of price collusion from research and development joint ventures, a greater degree of concentration resulting from joint ventures should be tolerated than would be tolerated if the increase in concentration resulted from merger. For the same reason, it is more difficult to ignore the possibility of efficiencies in the context of joint ventures than it is in the context of mergers. 26/ However, the danger of price and output collusion will vary with the circumstances surrounding the venture. If, for example, the venture involves basic research far removed from current price and output decisions, the danger of collusion is slight. As the objective of the venture moves closer to the development of the technology and to the marketing of the process, product, or service embodying that technology, the danger of facilitating collusion increases. 27/

Collusion at the production and marketing levels, however, is not the only potential threat posed by R&D joint ventures. In addition, there is the possibility that such a joint venture, if too overinclusive, may suppress innovation. Competition is as important in research and development as it is in any other commercial endeavor. The patent system--this country's main institutional stimulus for invention and innovation--is premised on that fact. A number of competitors, motivated by the promise of a limited grant of exclusive rights

and by the threat of being excluded if someone else develops the invention first, race to develop new products and processes. Condoning all-inclusive joint ventures--that is, joint ventures that control all research and development in an industry--would constitute a de facto repeal of our patent system.

The elimination of R&D rivalry by all-inclusive joint ventures presents a significant threat to innovation. 28/ Rather than having a number of decision makers exercising independent judgment as to which avenues of inquiry to follow or abandon, there would be only one or a very few. This failure to diversify R&D decisionmakers would increase the costs of individual mistakes.

Even more troublesome, overly inclusive research and development joint ventures probably reduce the incentive for innovation. Rather than many entities competing to be the sole owner of the fruits of research, the participants of an all-inclusive joint venture would be aware that they will get their share of whatever is developed. And if a member of the joint venture fails to develop the technology, his competitors will fail as well. The benefits of being a winner would be reduced and the costs of being a loser--that is, failing to develop new technology--would also be reduced. 29/

Moreover, a small number of joint ventures conducting research for an industry that is marked by high seller concentration and poor market performance (that is, by some oligopolistic pricing) may purposefully suppress innovation. Even though the development of an innovation might lower costs or increase demands for the whole industry, the joint venturers may view the potential research and development as a threat to the stability of their oligopolistic pricing arrangement. For example, new technology may make it more difficult to tell whether increases in the market share of a competitor are due to the new technology or to price competition. Also, new technology might enable new entry into the market. The benefits of the status quo, therefore, may outweigh the expected benefits of the innovation.

There is a particularly strong motivation for an over-inclusive joint venture to slow the rate of R&D when the joint venture has as its objective the development of technology to comply with government health and safety regulations. 30/ Since the successful development of the technology will raise the industry's costs without a compensating increase in demand, the joint venturers have an incentive to suppress the innovation as long as possible. That is not to say, however, that joint R&D is never a legitimate response to governmental regulatory standards and may never be structured in such a way as to minimize the risk that innovation will be suppressed.

The courts have been sensitive to the benefits and detriments that are associated with joint R&D. 31/ The analysis of those benefits and detriments provide the guiding rationale for devising rules--a structured "rule of reason"--that the courts should use in evaluating the antitrust legality of joint R&D ventures. Because the anticompetitive dangers of a joint R&D venture arise only when that venture includes a large portion of the competitors, the first step in applying the rules is to analyze the market structure within which the joint venture appears. In order to undertake this analysis, one must define the relevant market(s) and determine the joint venture's market share. 32/

2. Market Definitions and Market Shares

In evaluating the anticompetitive potential of a joint R&D venture, one must keep in mind that joint R&D ventures have two related, albeit distinct, potential anticompetitive effects: one on price and output competition among the joint venturers at the production and marketing stage and the other on the competition for the R&D itself. Those two effects generally will manifest themselves in two related, but distinct markets. Each of those markets must be defined and analyzed.

The market in which the possible anticompetitive effect on price and output may occur is the same market that would be relevant in attempting to analyze the potential anticompetitive effect of a complete merger between the joint venturers. There

is no need to describe in the present context the typical procedure for defining markets and evaluating the anticompetitive effects of mergers; on that topic the reader should refer to the algorithm set out in the Merger Guidelines. 33/ It is sufficient to note that with some slight modification the methodology for evaluating mergers is adequate to determine a joint R&D venture's probable effect on price and output competition at the production and marketing level. Modification of standard merger analysis would simply be required in order to take into account the fact that the potential for price and output collusion in the context of joint R&D is less significant than it would be in the context of an outright merger between the same firms. As explained above, the analysis must deal explicitly with the efficiencies realized by the joint R&D venture. The analysis should also recognize that the more basic the R&D the smaller the danger of price and output collusion, and that the danger of such collusion can be mitigated by the form that the joint venture agreement takes. 34/

Because of the unique nature of technology, defining a market and allocating market shares for the purpose of ascertaining the probable effect of joint R&D on innovation (i.e., the competition for R&D) raises special problems that deserve a brief examination. 35/ In evaluating this market, one must consider both the technologies that may compete with

the technology that the joint venture is seeking to develop and the assets that are currently performing, or can rapidly be shifted into, comparable R&D. Because at the time of formation one can only speculate as to the technology that a particular joint R&D venture will develop, it will be difficult, if not impossible, to determine what present and future technologies the venture's technology will ultimately compete against. The further the R&D is from yielding commercially exploitable technology, the more speculative will be the answer to this question. If the technology being pursued by the joint venture is sufficiently understood and developed to evaluate its commercial potential, alternative technologies that clearly would be competitive with the joint venture's technology should be included in the market definition. Technologies that would be at least 90 to 95 percent as efficient (in terms of their ability to provide equivalent consumer utility at equivalent cost) as the venture's technology would counteract the joint venture's ability to suppress innovation. In the likely event that it is impossible to determine clearly whether technologies will be equivalent, one must rely heavily on the identification of commercial entities who are performing, or could relatively rapidly begin to perform, R&D that is similar to that performed by the joint venture.

The relevant R&D market must be defined largely by identifying firms (other than the joint venturers) that are undertaking the same or similar R&D, or that would be willing and able to undertake similar R&D in response to an increase in the expected rate of return on the investment in that R&D. 36/ It is not essential that those commercial entities currently compete with the joint venturers at the production and marketing stage. Rather, what is crucial to evaluating competitiveness are the facilities and technologies to which the commercial entity has access. To be included in the market, entities must have the willingness and ability, either individually or in collaboration with one another, to use their facilities and technologies to undertake R&D comparable to that of the joint venture in response to a small but significant, non-transitory rise in the expected returns to investment in that R&D.

The unique nature of technology also is important in defining the relevant geographic market in which a particular joint R&D venture competes. 37/ Transportation costs generally play a significant role in setting the limits on the geographic scope of a market for products or services. However, transportation costs are largely irrelevant to an analysis involving R&D and technology, and the relevant market generally will be international in scope.

Although a product or service that is made in Japan, for example, might not be competitive in United States markets because of transportation costs, the Japanese technology used to manufacture the products generally could be licensed in the United States and employed to make the products here. There are at present well established channels for the international transfer of technology. Moreover, the United States generally has not erected protectionist barriers to exclude foreign technologies. There may, of course, be special circumstances, such as prohibitions against the export of technology for national security reasons, that will prevent the market for R&D from being truly world-wide. Nevertheless, foreign R&D usually will be in competition with equivalent R&D being performed in the United States.

After the market within which the R&D competes has been defined, the market share of the joint venture must be calculated. 38/ In calculating market shares, one would ideally like to have a measurement that reflects the relative ability of the market participants to engage in successful R&D. Such a measurement might be based on each firm's total investment in R&D weighted in some way to reflect the relative R&D efficiency and effectiveness of each firm. The weighting would reflect the fact that even though two firms spend identical amounts on R&D, one may be a more significant provider of R&D because, for example, it has access to superior technological information.

There is currently no ideal measurement. As a result, a rough proxy, such as absolute expenditures on related R&D or total sales, must be used. Because these proxies are rough, they should be adjusted on the basis of qualitative indicia of the relative ability of the market participants to perform R&D. Such indicia would include past R&D successes, employment of scientists and engineers of proven ability, and ownership of state of the art R&D facilities.

3. Analyzing the Danger of Suppression of Innovation

Because the analysis of the potential for price and output collusion is sufficiently similar to traditional merger analyis and has been discussed above, there is no need to deal further with that subject here. Because of the differences between the price and output collusion on the one hand and suppression of innovation on the other, it is useful to describe the criteria for determining when a joint R&D venture has a significant potential of suppressing innovation.

There is little theoretical or empirical research that provides a basis for determining the minimum number of entities capable of performing R&D that can exist before one becomes concerned about the possibility that innovation will be suppressed. 39/ However, if a joint venture is sufficiently small so that five other commercial entities--either individual firms or other joint ventures--can be formed in that market, then the venture's anticompetitive potential generally will be

de minimis. Regardless of whether the joint venturers can show that their collaboration is necessary to achieve efficiencies, a joint venture that has less than a 15 percent market share is sufficiently innocuous that it should not be proscribed by the antitrust laws. 40/

If the joint R&D venture has a market share in excess of 15 percent, however, the joint venturers should have the burden of demonstrating that a joint venture of that degree of inclusiveness is necessary to achieve significant economies. The joint venture would have to achieve significantly lower costs than a venture that contained a smaller fraction of the market participants.

The burden on the joint venturers to show that efficiencies justify the size of the venture would grow in relationship to the inclusiveness of the venture. 41/ Conceivably, a joint R&D venture that included all competitors might be tolerated when potential economies of scale dictate that no more than one joint venture can efficiently service the market. Theory would suggest that when the average cost of R&D continues to fall significantly even after more than 50 percent of the firms in the market have joined the venture, the joint venture is a natural monopoly. It is inevitable that there will only be a single entity performing R&D. Allowing the inevitable to be attained through a consensual joint venture arrangement would be no more (and may actually be less) costly to society than

waiting for market forces to eliminate all but one competitor. 42/ However, natural monopoly joint ventures are certainly very rare, and it is highly unlikely that a joint venture that is formed by all competitors in the market could be justified on that ground.

Where natural monopoly conditions prevail and a joint R&D venture that includes more than 51 percent of the market is spared antitrust condemnation, a difficult dilemma remains. If other market participants are excluded from the venture, they will have a strong argument on equitable grounds that they should be allowed access to the joint venture. Because, ex hypothesi, the market will not support another entity performing R&D, without access to the joint venture the other market participants may be denied the ability to participate in R&D that is essential to their future competitive viability. On the other hand, if the joint venturers are compelled to accept the remaining firms in the industry as partners, the incentives of the members to invest in R&D may be reduced or even destroyed.

There has as yet been no theoretical resolution of this dilemma. Fortunately, the natural monopoly phenomenon in the context of R&D appears to be very rare, if it exists at all. Nevertheless, in the rare instances where a joint R&D venture is clearly a natural monopoly the antitrust laws might require that access be provided to all market participants so long as

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those provided access are required to share fully in the costs and risks of the venture. 43/

Unfortunately, there is some perception that the law goes further and requires that access, either to the joint R&D venture itself or to its fruits, e.g., patents, be provided "on reasonable terms" whenever a joint R&D venture is in some way unique. 44/ Such an interpretation of the law can be devastating to the incentives to form efficient joint R&D ventures. As explained above, problems of risk and "free-riding" create disincentives to investment in creating and exploiting technology. The intellectual property laws provide successful inventors with exclusive rights to their technology. Those rights which allow inventors to enjoy the fruits of their investment and so serve as the incentive for investment in R&D are an efficient solution to these market disincentives. An interpretation of the antitrust laws that destroys or dissipates those rights and that reduces the level of R&D without achieving some clear, off-setting benefits does not promote consumer welfare and so is contrary to the underlying rationale of the antitrust laws.

4. Possible Disincentives Caused by the Antitrust Risk for Joint R&D

There is substantial reason to believe that the antitrust laws would accommodate the rule of reason approach described above, without the generous access provisions that some argue

are part of the law currently. Nevertheless, because of the lack of case law, it remains a possibility, albeit very slight, that some court may apply a per se rule of illegality to joint R&D. Moreover, even if it were clear that a rule of reason approach applies, some uncertainty as to the legality of any given joint R&D venture inevitably would remain. There is some uncertainty in the application of any analysis that is sufficiently flexible to distinguish procompetitive from anticompetitive joint R&D ventures in a myriad of factual circumstances.

Even though the uncertainty will be slight in most cases, the risk is substantially increased by the length, complexity and cost of antitrust suits and by the fact that a successful claimant under the antitrust laws is automatically entitled to three times the damages actually suffered. This risk alone may deter some procompetitive joint ventures.

In addition, because of the possibility that courts may improperly condemn successful joint R&D ventures that exclude competitors, the threat of treble damages represents a formidable lever that competitors can use to force their way into a successful venture. As a result, potential joint venturers may decide that the only way to reduce the treble damage risk sufficiently is through a joint venture that includes all United States competitors. However, because such inclusion will have costs--for example, revealing proprietary

information necessary for R&D to many competitors who contribute no beneficial assets or skills in return--the joint venturers may decide to forego the economies available from a joint venture and to engage individually in less efficient R&D. 44a/

B. Impediments to the Exploitation of Intellectual Property

Although the judicial interpretation of the relationship between the antitrust laws and joint R&D probably has not by itself been a significant impediment to investment in R&D, it is likely that the unjustified hostility exhibited toward intellectual property by the courts and the federal antitrust enforcement agencies has had a significantly more adverse effect on R&D investment. This hostility impairs both the incentives to engage in R&D and the efficiency with which the fruits of R&D can be exploited. By failing to recognize the importance of intellectual property and its efficient exploitation, the courts and antitrust enforcers have impeded this country's short-term and long-term productivity.

1. The Benefits of Intellectual Property Licensing

The ability of the owner of intellectual property to exploit its property by licensing others will directly increase the perceived value of the property. By increasing the expected value of an investment in R&D, the ability to license increases the investment in, and hence output of, intellectual property. Licensing, therefore, over the long run, enhances this country's productivity.

Moreover, in the short run, once the property has been created, licensing enables the intellectual property owner to combine the information embodied in the property with the superior assets and skills of others. Technology thus can be brought to the market more quickly and at a lower cost than otherwise would be possible. At the extreme, if licensing were severely inhibited, the technology might never reach the market.

To protect the intellectual property owner's exclusive rights and so to maximize the output of, and returns to, that property, it is sometimes necessary for the owner of the intellectual property to include in a license certain restrictions on the licensees' actions. Restrictions may also be necessary to induce the licensees to invest in the further development and exploitation of the technology. To understand these procompetitive benefits of licensing, it is helpful to examine several examples of common license restrictions.

First, to exploit efficiently intellectual property that has a variety of uses, intellectual property owners often resort to exclusive field of use licenses. Frequently, a technology has applications in more than one area. For example, transitor technology has uses that range from the simple pocket radio to the most complex computer. It is rare, however, that the inventor of any particular technology also has the wide variety of skills necessary to exploit every

possible use to which the technology may apply. The efficiency of exploitation and the returns to the technology's owner would be maximized if in each field of use in which the technology has some potential and its owner is not itself the optimal exploiter, a license was granted to the firm that could most efficiently develop and exploit the property.

Without some guarantee of exclusivity against other licensees, an owner or a licensee may be unwilling to invest the resources necessary to develop fully the field of use in which he possesses expertise. Once the basic technology is created and sheathed with intellectual property protection, a great deal more "mini-innovations" still must be produced before the technology can be applied to each field for which it holds some promise. 45/ However, without some protection against the ability of others to free-ride on those "mini-innovations," there will be a strong disincentive for the owner and his licensee to invest in the necessary innovation. The exclusive field of use license is, in effect, an efficient device that employs the intellectual property protection afforded underlying technology to overcome the threat that free-riding poses to subsequent "mini-innovations." Field-of-use restrictions thereby induce the investment in further innovation that is necessary to exploit all the potential uses of the technology. The licensee cannot practice the technology outside his field of use and, therefore, may not

free-ride on the innovations of the owner or other licensees that practice the technology in other fields. At the same time, the licensee is guaranteed that other licensees will be prohibited from free-riding on his innovations, and, hence, the licensee generally will invest to assure that the technology's potential in his field of use is fully realized. By using the underlying intellectual property protection to restrict competition among licensees in various fields, the field of use license can induce innovation that further enhances productivity.

Second, where it is necessary to license more than one firm in any particular field of use a patentee could reasonably resort to a price restriction in a non-exclusive license to assure that the technology is exploited efficiently. Even when a technology has only one application, it takes a great deal of time and investment for technology to be transformed from an idea to a marketable good or service. This transformation involves a variety of necessary, often expensive activities, including development of a prototype product, development of a low cost manufacturing process, plant design and construction, development of a distribution system, marketing and advertising. 46/ Often a single firm will be unable to perform all of these functions internally and will have to enlist third party licensees to aid in the development and exploitation of the technology.

As an alternative to licensing a single firm to each of several fields of use or territories, the intellectual property owner may induce his licensees to invest in the development of the technology through the use of licenses that establish a minimum price at which products made pursuant to the license can be sold. Aware that the intellectual property owner has included such a provision in his licenses, the licensee can invest in the development of manufacturing, distribution and/or marketing of the technology without the fear that some other licensee who is not required to sell at the minimum price will be able to free ride on the investment.

So long as the restriction is not used to facilitate collusion and suppress innovation, one can safely presume that as a general matter the license restriction will not reduce efficiency. A license restriction that allows the licensee to charge more than the licensee's marginal cost is probably the quid pro quo for some benefit the licensee is conferring on the patentee. Otherwise, the patentee would be gratuitously aggrandizing his licensee to the patentee's financial detriment. For any technology (or good for that matter) there is a single profit maximizing price (or set of prices if price discrimination is possible). The entity owning the technology generally has the ability and the incentive to appropriate all the profits generated by the technology. So long as the the owner of the technology is a profit maximizer, he will attempt

to ensure that those who must participate in the process of exploiting the technology do so at lowest possible cost. To the extent that downstream participants charge prices that reflect more than the lowest possible cost at their level of participation, the technology owner's profits are decreased. It is unlikely, therefore, that a rational technology owner would purposefully allow the downstream participant to receive more than the absolute minimum possible.

Another license restriction that can increase the efficiency with which the technology is exploited is the requirement that the licensee "grant-back" to the intellectual property owner a license on any improvement of the property developed by the licensee. Although grant-backs can be anticompetitive under certain situations, they also can be a device for the owner of technology to reduce the transactions costs of contracting for development of technology. If the owner of the technology does not include a grant-back in the license, he and the licensee will have to bargain for a grant-back license after the licensee has developed the improvement. At that point, however, the licensee will have some market power vis-a-vis the technology owner, and the transaction will be fraught with the problems generally associated with small numbers bargaining. 47/

In addition, a grant-back is a device for transfering some of the risk associated with development of improvements from the licensee to the owner of the technology. The technology owner generally agrees to a lesser royalty in exchange for the grant-back.

It is true, of course, that a grant-back could dull the incentive for the licensee to make improvements in the technology. However, without a license to use the underlying technology in the first place, a firm often would not be willing to engage in the effort to improve the technology. Practicing the improvements would likely infringe patents covering the basic technology; therefore, before the improver of the technology could use or sell the improvement, he would have to obtain a license for the underlying technology. The patent owner would be able to appropriate a great deal of the returns to the improvement, if he chose to issue a license at all. As a result, there would be very little incentive for non-licensees to invest in the improvement of patented technology.

One final patent restriction which is worthy of note is the "tie-in." A tie-in provision essentially conditions the license of the technology (or the sale of a product or service that embodies the technology) upon the licensee's agreement to purchase from the technology's owner some other good or service that does not embody the technology. As with the other restrictions discussed above, tie-ins can be anticompetitive.

Nevertheless, like the other restrictions, tie-ins also can enhance efficiency.

First, potential licensees might be unwilling to obtain a license for a technology if they are uncertain as to the technology's utility. If, on the other hand, an owner can license his technology at a low price, and charge a price in excess of marginal cost for some item used in conjunction with the technology, the owner and licensee could share the risk that the technology is useless. If the technology is very useful, the licensee will require a large number of the related items, and the owner will receive a large reward for his technology. If, however, the licensee is unable to use the technology, it will require very few of the related items and will have to pay little more than the low license fee for the technology.

Similarly, a tie-in can allow the owner of technology to meter differences in demand among various licensees and to extract higher payments from licensees with more intense demand and lower payments from licensees with less intense demands. 48/ The ability to engage in such metering will increase the appropriable returns to the technology. In addition, it may also increase output of the technology (and thereby increase consumer welfare) by enabling a potential licensee, who has a less intense demand for the technology and who would be unwilling to pay the single price the technology's

owner would charge if there were no metering, to obtain a license. Tie-ins also may be used to ensure that the technology is combined with related inputs in the most efficient manner to produce some end product. 49/ This in turn can also help to ensure that the product that embodies the technology is of optimal quality, which may be important in obtaining the market's acceptance of a new technology. In addition, tie-ins may be the most efficient mechanism to enforce the exclusivity of intellectual property when that property otherwise is easily infringed. 50/

Despite the fact that license restrictions can be used to enhance efficiency, increase the returns to R&D, and so provide an incentive for innovation, licensing of intellectual property can also be used in ways that threaten consumer welfare. For example, a commercially weak patent licensed industry-wide might be used to cartelize a market. 51/ Similarly, a patent owner with few potential competitors might license his patent to those competitors, allow them to share his supra-competitive profits and so induce those competitors not to develop competing technologies. In addition, an intellectual property owner conceivably could use a tie-in to impede the entry of competing technologies into the market.

Whether a licensing arrangement happens to be anticompetitive depends on the surrounding circumstances. As with joint R&D, structured rules can be developed so as to

provide a practicable means for determining whether a particular licensing arrangement is anticompetitive vel non. Although this paper does not provide a forum for setting out those rules, in general the appropriate dichotomy between procompetitive and anticompetitive licensing practices under the antitrust laws can be described with reasonable accuracy by two relatively familiar antitrust terms, "vertical" and "horizontal." 52/ A practice that suppresses rivalry between actually or potentially substitutable technologies can quite accurately be said to have a significant horizontal aspect. Many arrangements between an intellectual property owner and others who wish to use the property, however, raise no competitive concerns, precisely because they have no potential for suppressing rivalry among alternative technologies. Instead, the arrangements are properly characterized as vertical and frequently may have a positive, or at least a neutral, effect on competition.

It should be noted, nevertheless, that the labels "vertical" and "horizontal," should be carefully applied, particularly in the context of intellectual property licensing, so as not to exalt form over substance. For example, where a patentee manufactures the patented product and also licenses others to manufacture the product, the patentee and licensees appear at first blush to be competitors. However, upon

reflection, because the patentee as owner of the technology is upstream from the manufacturing, in the absence of other factors, the relationship is really vertical.

Although intellectual property licensing is largely procompetitive and promotes productivity, the courts and (until recently) the antitrust enforcement agencies of the federal government have frequently been insensitive to this fact. This hostility toward intellectual property has manifested itself in the development of precedents under the antitrust laws and under the related doctrines of patent and copyright misuse.

2. Judicial Misinterpretation of the Antitrust Laws

Although both the intellectual property and antitrust laws serve to promote consumer welfare and productivity, this fact has often been ignored by the courts and the federal government. Rather than judging the competitive merits of intellectual property licensing arrangements solely on the basis of sound economic analysis, all too frequently the courts have focused on the overly simplistic notion that there is an inherent conflict between the antitrust laws and intellectual property law. Supreme Court decisions have depicted the patent system as inherently in conflict with antitrust goals and have depicted the patent grant as a "monopoly," 53/ the limits of which are to be "narrowly and strictly confined," 54/ so as to avoid the "evils of an expansion of the patent monopoly by private engagements." 55/ One lower court recently stated that

the patent grant "is in inevitable tension with the general hostility against monopoly expressed in the antitrust laws . . . . Therefore, courts normally construe patent rights narrowly in deference to the public interest in competition." 56/

The courts are not alone in their misperception of the essence of the antitrust and intellectual property laws. Even sophisticated students of economics and the law seem to suffer under the same delusion. In fact, one commentator, while condemning the inhibitive effect the antitrust laws have had on joint R&D, has stated that "the patent monopoly stands as a solid exception to the antimonopolistic presumption of the antitrust laws." 57/

The courts and commentators, however, have not been especially careful in their analysis. They have confused semantics with analysis. Although it is true that patents are generally referred to as monopolies, in an economic sense they are not invariably "monopolies," any more than tangible assets are monopolies. As explained above, regimes of intellectual property are designed to enable the creators and developers of the property to appropriate some of the benefits generated by that property. In that sense, they have the same objective as any system of property rights. By themselves, those exclusive rights do not enable the intellectual property owner to charge a price above marginal cost--a prerequisite of an economic "monopoly." As in the case of tangible property, the ability

of an intellectual property owner to charge more for his property than its marginal cost (which is zero in the case of intellectual property) depends on the demand and supply conditions its owner faces. It is not infrequent that competition from other technology prevents an intellectual property owner from charging a positive price for its property. Similarly, in the real, as opposed to the theoretical world, it is not infrequent that the owner of tangible property is able to charge more than marginal cost, yet not so much more that one could reasonably characterize the property owner as a monopolist.

Equally important, those who see inherent conflict between the patent and antitrust laws unjustifiably confine themselves to a static view of the world. Without the promise of rewards provided by a system of exclusive rights, the intellectual property would not exist. And of course if the market failed completely to produce the technology, consumers would be worse off than if they were required to pay a price above the technology's marginal cost.

One particularly unfortunate effect of this failure to perceive correctly the true relationship of intellectual property and antitrust law has been the development of the tie-in doctrine as it applies to intellectual property. In the late 19th and early 20th Centuries, the courts were sensitive to the procompetitive benefits of intellectual property

tie-ins. 58/ As a result of a judicial gloss put section 3 of the Clayton Act, however, the courts since that time have indiscriminately condemned intellectual property tie-ins without regard for their underlying competitive merits. 59/

Moreover, the courts have come to treat intellectual property tie-ins even more harshly than other tie-ins. Generally under the antitrust laws, tie-ins are "per se" unlawful whenever three conditions are met, including the condition that the seller have sufficient economic power in the market for the tying product to restrain trade appreciably in the market for the tied product. 60/ Substituting semantics for careful reasoning, the courts irrebuttably presume that when the tying product is intellectual property, there is economic power. 61/ As explained above, that presumption is no more justified in the context of intellectual property than it is with regard to any other property.

The courts have not limited their vitriol to tie-ins alone. Courts have increasingly been inclined to treat price restrictions in patent licenses as per se unlawful. 62/ In addition, even those license restrictions, such as grant-backs, 63/ or field-of-use licensing, 64/ that are not subject to per se proscription may be subjected to undue hostility under an ostensible rule of reason that is not fully sensitive to the procompetitive benefits of licensing. 65/

During the last decade, both the Justice Department and the Federal Trade Commission also embraced enforcement policies that were unduly hostile towards intellectual property. In fact, the Antitrust Division's stated enforcement policy against patent licensing practices surpassed even the courts in its indiscriminate scope and viturperative nature. That enforcement policy consisted of a list of nine licensing practices--the nine "no-nos"--that the Division would challenge as per se violations of the antitrust laws. 66/ Similarly, the FTC manifested irrational hostility toward patents in the complaints, filed against DuPont 67/ and Xerox. 68/ The development of new technologies by those companies apparently was challenged for little reason other than that the companies were so spectacularly successful.

Although the courts and the antitrust enforcement agencies have begun to take a more rational approach to intellectual property, 69/ some misperceptions still exist. The past judicial hostility, combined with the mandatory treble damage remedy provided by the antitrust laws, has surely deterred some procompetitive licensing arrangements and so continues to have an adverse effect on the returns to, and the incentives to invest in, innovation. Moreover, this disincentive has been exacerbated by the even more irrational development of the misuse doctrine under the patent and copyright law.

3. The Misuse Doctrines

The misuse doctrine in patent and copyright law derives from the courts' equitable powers and is invoked to justify a refusal to enforce a valid copyright or patent against infringement. 70/ Because the judicial remedy--refusal to enjoin infringers--is so drastic and because one need not be injured by the misuse to invoke it as a valid defense to a charge of infringement, the misuse doctrine has an even greater potential as a disincentive to innovation than the antitrust laws. Moreover, because the courts have been even more draconian in their unwillingness to countenance license restrictions under the doctrines of misuse than under the antitrust laws, the misuse doctrine likely may be an even more significant deterrent to innovation than the antitrust laws themselves.

The doctrine of misuse was originally developed by the courts to deny legal protection to intellectual property until that property was purged of any taint that resulted from its use by the owner in an anticompetitive manner. By employing the property to anticompetitive ends, the intellectual property owner abused his exclusive rights and thereby was enabled to earn more from his property than the law intended. In refusing to enforce the exclusive rights, the courts in effect were refusing to use their equitable powers to assist someone with "unclean hands."

The doctrine originally developed as a complement to the antitrust laws in the sense that the same analysis used to evaluate a claimed violation of the antitrust laws was also used to evaluate claimed misuse. However, the doctrine eventually began to drift away from this concept. The courts began to employ per se rules even more rigid than those employed under the antitrust laws. For example, courts automatically condemned other potentially procompetitive license restrictions, including those that require the licensee to refrain from dealing in products that compete with the patented product (tie-out or exclusive dealing), 71/ that require the licensee to take a license under a group of patents even if the licensee desires a license for only one (compulsory package licensing), 72/ that require the licensee to pay royalties under the patent based in whole or part on the sales of an unpatented product (total sales royalties), 73/ and that require the licensee to pay royalties on sales after the patent expires. 74/

Judges also began to use the misuse doctrine to invalidate intellectual property on the basis of vague notions of what seemed "unfair" to them. For example, the courts have found misuse where a patentee licensed one licensee at a royalty different from that charged other licensees, 75/ where a patentee refused to license someone after others had been licensed, 76/ and even where the patentee charged rates that a judge deemed to be exorbitant and oppressive. 77/

It is not entirely clear that courts should refuse to enforce patents and copyrights on ground of misuse in cases where the infringer has not been injured. Nevertheless, the doctrine should at least conform to antitrust analysis if it is to remain available to the courts. Before a misuse can be found, the courts should be required to perform the same economic analysis using a structured rule of reason that it should perform when analyzing an intellectual property owner's conduct under the antitrust laws. Only conduct that is more likely than not to be anticompetitive and hence violates the antitrust laws, should constitute misuse. Unless this change is made, the misuse doctrine, combined with the whim and caprice of judges unsympathetic to the importance of intellectual property, will further erode the value of intellectual property, reduce incentives for R&D, and so exacerbate the productivity problems the country currently faces.

C. Needed Modifications of the Legal Framework

Although the present antitrust laws and their underlying rationale are conducive to the creation and exploitation of new technologies, judicial misinterpretation of those laws and excessively punitive remedies available under the statutes act as disincentives to innovation. The misuse doctrines under the patent and copyright laws further aggravate these disincentives for innovation. The solution is not to repeal the substantive antitrust laws and to legislate new substantive standards.

Rather, with a few modifications of the remedies and evidentiary presumptions under the antitrust laws, the nation can insure that the antitrust laws will not inhibit productivity and innovation. At the same time, the patent and copyright doctrines of misuse should be modified to assure that patents and copyrights will not be invalidated under the doctrine unless the conduct deemed to be misuse would be found anticompetitive under antitrust analysis. While promoting procompetitive practices that are essential to the creation and exploitation of technology, these modifications would also preserve antitrust standards to guarantee that the nation's desire to promote R&D will not be improperly used to shield practices that are on balance anticompetitive and so inimical to innovation and productivity. 78/

1. Clarification of the Evidentiary Rule, and Modification of the Remedies, Applicable to Joint R&D

There is a need to respond to the perception that the antitrust laws inhibit joint R&D ventures, even where such collaboration is necessary to perform R&D in the most efficient manner. Although the antitrust laws are generally sympathetic to R&D collaboration where it results in significant reductions in cost, uncertainty as to whether some court may wrongly conclude that a particular joint R&D venture is illegal may inhibit the venture's creation. Even though the risk of an incorrect legal decision may be small, that risk is exacerbated by the length, complexity, and cost of antitrust suits and the

fact that a successful claimant under the antitrust laws is automatically entitled to three times the damages actually suffered. Industry fears that after investing large amounts of capital in a venture, it may be faced with the threat of a treble damage suit from a disgruntled competitor who has been excluded from the venture. And, of course, the risk of such a suit increases in direct proportion to the economic success of the joint venture.

There have been a variety of legislative proposals that seek to address this general problem. 79/ Several of these proposals seek to alleviate the antitrust risk that joint R&D ventures face by replacing the current antitrust standard with a different standard for scrutinizing the legality of joint R&D. However, none of the various standards that have been proposed would be as effective as the current antitrust standard in distinguishing procompetitive ventures from anticompetitive ones. Moreover, some of those bills include requirements that the joint ventures provide open access to all United States competitors and that the joint ventures license the fruits of its R&D to all applicants after a reasonable period of time. These provisions not only would fail to promote efficient R&D, but in fact would dissipate the incentives for R&D and so inhibit innovation. In addition, some of the proposals are unattractive because they would transform the Justice Department from its traditional role as

an enforcer of the law to that of a bureaucracy regulating the structure and conduct of all joint R&D ventures, regardless of their anticompetitive potential.

The best solution to this difficult problem would have two objectives. First, it should be made clear that joint R&D ventures may not be deemed per se illegal under the antitrust laws. Although there is no recent case holding joint R&D activity illegal per se, clarification would eliminate all uncertainty on this account. The clarification would prohibit the courts from condemning any joint R&D venture under the antitrust laws without first considering its potential competitive benefits.

Second, it would be appropriate to amend the antitrust laws to provide that those joint R&D ventures that have been fully disclosed to the Justice Department and the Federal Trade Commission would be immune from any antitrust suit brought by private parties. Such a change in the law would not entail government certification that the venture was legal under the antitrust laws, and if the venture was anticompetitive, the government would remain free to challenge it. This change in the legal remedies that apply to joint R&D thereby would eliminate the deterrent effect that any legal uncertainty may now have on joint R&D efforts, and at the same time it would retain adequate antitrust safeguards against anticompetitive joint R&D activity.

2. The Elimination of the Treble-Damage Remedy for Conduct Judged Under the Rule of Reason

Similarly, antitrust remedial law should be amended to eliminate mandatory treble damages for all but the most serious antitrust violations. The treble damages remedy is appropriate and necessary to deter conduct that is plainly and inherently anticompetitive and that is carried out in secret. However, where the conduct may very well be procompetitive and is carried out in the open, the availability of punitive damage remedies is unfair and counterproductive.

The antitrust legality of a wide range of business practices that are not clearly anticompetitive frequently may be uncertain at the time the practices are conceived and employed. The legality of these practices will generally turn on specific circumstances that may never before have been dealt with by the courts. By greatly increasing the cost associated with the risk that a court may find conduct illegal that in fact is procompetitive, the threat of treble damage liability surely inhibits at least some innovative business practices that could increase efficiency and productivity. For example, the threat of treble damage liability may deter a manufacturer of products that uses advanced technology, such as computers, from restructuring its system of manufacturing and distribution in a way that would lower its cost and enable it to disseminate its technology to a greater number of consumers. It is even

possible that the overdeterrence of the treble damage remedy is partially responsible for the seeming reluctance of American management to take vigorous steps to meet the challenge of foreign competition.

With the exception of joint R&D activity, the most obvious and potentially devastating effect that the availability of treble damages can have on innovation and productivity appears in the area of intellectual property licensing. Given the hostility that the courts have frequently manifested toward intellectual property and its licensing, businesses may understandably hesitate to enter into such arrangements for fear that some court might someday condemn the arrangement as anticompetitive and require the patentee to pay treble damages. The unreasonably excessive penalty of treble damages that the courts can impose on such licensing likely discourages the transfer of at least some technology and so reduces the rewards to successful R&D. As a result, the overall incentive to invest in R&D is likely to be reduced.

As a corollary to the elimination of the treble damage remedy for conduct other than that which is inherently anticompetitive, the antitrust laws should enable parties injured by non-treble-damage violations to obtain their actual damages plus prejudgment interest calculated from the date the suit is filed. By amending the law to include prejudgment interest for the first time, such a reform would assure that

those who suffer injury as a result of an antitrust violation will be made whole. At the same time, by eliminating treble damage liability for conduct that is not clearly anticompetitive, the deterrence that the antitrust laws may have on potentially beneficial practices would be minimized.

As a "second best" alternative to a general elimination of treble damages, antitrust remedial law should at least be amended to eliminate the treble damage remedy for conduct involving intellectual property licensing. Because that conduct can be extremely procompetitive and because the treble damage remedy is unnecessarily punitive, it is essential that this deterrent to the efficient exploitation of the fruits of R&D be eliminated. A remedy of actual damages plus prejudgment interest is sufficient to protect those injured by anticompetitive intellectual property licensing.

3. A Prohibition on the Courts' Ability to Condemn Intellectual Property Licensing As Per Se Unlawful

For the same reasons, the antitrust laws should be clarified to prohibit the courts from condemning intellectual property licensing as per se unlawful. To enable intellectual property owners to obtain the maximum legitimate rewards possible for their efforts, it is crucial that the courts carefully consider procompetitive benefits when evaluating the lawfulness of intellectual property licensing under the antitrust laws. While many courts appreciate the competitive benefits of intellectual property, the occasional judicial

hostility shown toward intellectual property in the context of antitrust suits must be proscribed. A law clearly stating that intellectual property licensing cannot be deemed per se illegal would inform the courts that intellectual property licensing arrangements generally enhance rather than impede innovation and productivity and that the antitrust laws must be sensitive to this fact.

4. Modification of the Patent and Copyright Doctrines of Misuse

It is also necessary to clarify the patent and copyright doctrines of misuse to mitigate the danger that the courts will use those doctrines as a vehicle for venting judicial hostility toward intellectual property. The misuse doctrine, which the courts use to justify a refusal to enforce patent and copyrights, can provide a devastating disincentive to innovate. If the doctrine is to continue to exist, the courts must be required to apply it in a manner that is consistent with the procompetitive exploitation of intellectual property. The law should clearly provide that before the courts can find that the exploitation of a patent or copyright constitutes misuse, they must determine pursuant to an analysis grounded in economic theory that the conduct is anticompetitive and a violation of the antitrust laws.

5. Closing the "Loophole" in Process Patent Protection

Finally, one problem, not heretofore discussed in this paper, which should also be targeted for reform, involves a loophole in the United States patent laws that has impaired the ability of process patent holders to earn their rightful reward and so has artificially reduced the incentive to create and develop process inventions and innovations. Moreover, this loophole has created a perverse incentive for United States firms to manufacture products outside this country using foreign labor.

Process patents are particularly important in any effort to increase the productivity of labor and the competitiveness of industry. Those patents generally are granted for new uses of existing goods or for new ways to produce existing goods. They enable industry to manufacture products at minimum cost.

Under current law the owner of a patent covering a process has significantly less protection against the unauthorized use of his invention than the owner of a patent covering a product. Where a product patent is involved, a firm cannot avoid infringement by manufacturing the product overseas and then importing it into the United States because the use or sale of the product in the United States would infringe the United States product patent. Where a process patent is involved, however, there is currently no generally effective means by which a patentee can prevent a firm from practicing

the process patent overseas and then selling the product made by that process in the United States. Under United States patent law, this conduct does not constitute infringement of the process patent. This loophole not only discourages firms from investing in R&D aimed at discovering new and better processes, but it also encourages firms to perform the manufacturing overseas with foreign labor when a United States process patent is involved.

This loophole may be particularly devastating when one considers that genetic engineering, which generally relies on process patent protection, is one of the most promising new areas of high technology. If the loophole in the legal protection afforded process patent is not closed, the technological advantage that the United States currently holds in genetic engineering may rapidly dissipate along with the promise of new jobs that the technology currently holds.

It seems obvious that this loophole should be closed. The law should be changed so that sales in the United States of a product made by a process covered by a United States patent are classified as an infringement of the process patent, regardless of where in the world the patent is practiced.

II. NATIONAL INDUSTRIAL POLICY, CENTRAL PLANNING, AND ECONOMIC EFFICIENCY

The reforms set out above constitute only minor modifications of the legal framework within which the creation and exploitation of technology must take place. These

modifications would help to assure that the nation's overall legal and economic environment does not unreasonably inhibit investment in R&D. Moreover, these reforms would enhance the ability of the market to channel R&D investment into those areas that hold the greatest economic promise. However, the changes would not (and should not) interfere with the market mechanism, nor would they (nor should they) require any intervention in the market by government bureaucracies.

A number of other proposals to increase the country's productivity are far more drastic; they would require that the market mechanism itself be supplanted, in varying degrees, by bureaucratic decisionmakers. Omniscient bureaucracies would "target" industries and technologies into which the nation's scarce capital would flow. In addition, the bureaucracies would ease the pain, and hasten the exit, of dying industries. Even substantive antitrust laws would have to yield where the bureaucrats found them to be a hindrance. Although the proponents vehemently deny they are advocating any form of central planning, it is often difficult to see the difference.

The proposals for such an "industrial policy" have come from literally all parts of the political spectrum. The details of the proposals vary widely. 80/ Nevertheless, all the proposals seem to be premised on the beliefs that markets and the private sector are incapable of dealing with our economic problems and that the government should step in,

cooperate with business and labor, help to coordinate our economy, and aid United States industry in its efforts to compete in international markets.

The proposals generally call for a "closer cooperation" among business, labor and government. The advocates claim that through such cooperation the American economy can adapt more smoothly and quickly to structural changes and can be strengthened to compete with its foreign counterparts. Moreover, such a policy is necessary, according to the advocates, because by focusing on short-run profits, this country's capital markets tend to neglect promising new technologies. This strategy would be implemented by targeting industries that show the greatest promise and by providing subsidies in the form of low interest loans, export credits, tax breaks, lax antitrust enforcement, and the like. Those subsidies would also be designed in such a way as to overcome what is deemed to be outmoded, inefficient management practices that supposedly have made it impossible for the market by itself to respond to structural changes in the economy. Also, the policies generally call for import protection of targeted domestic markets through the use of tariffs and import quotas, conferring indirect subsidies on the favored industries in the form of non-competitive profit margins and hidden sales taxes on consumers.

The model for these proposals is clearly the Japanese Ministry of International Trade and Industry--"MITI." The apparent successes of Japan, which has adopted such policies, also serve as a partial excuse for the abandonment of the ideals of free trade and free markets. The advocates of such a policy argue that the United States is losing the competition for international markets because of its failure to adopt similar policies. Upon closer scrutiny, the arguments of the advocates for industrial policy are unpersuasive and fail to consider critical countervailing factors.

First, the advocates for a national industrial policy generally idealize the Japanese experience and ascribe far too much importance to the role that the Japanese government has played in Japan's economic success. Japanese economic growth has seemed so impressive relative to our own because it started from a base so far below our own. 81/ In addition, some measure of the Japanese success has been due to the ability of Japanese industry cheaply to copy technology developed at great expense in this country. And, currently, exchange rate values--affected by a number of factors mentioned at the beginning of this paper--account for much of the apparent success of some Japanese industries to export to the United States. Moreover, a number of other factors that have nothing to do with MITI, such as lower wage rates, flexible management-labor relations, high personal savings rates, and plain "luck," have contributed to Japan's economic success.

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Furthermore, the Japanese economy has not been without its own problems. At present it is experiencing overcapacity in industries such as steel, textiles, and aluminum. The Japanese petrochemical industry is operating at only about 50 percent of capacity and is complaining of encroachments by U.S. companies.

On the other hand, there is no denying that the recent performance of the Japanese economy has been very impressive. However, it is very possible that Japan's success has come in spite of, rather than because of, government interference.

Although information on the relationship between government efforts and Japanese growth is limited, there are some indications that much of what passes as fact concerning the Japanese government's ability to outperform the market is simply untrue. First, the public sector in Japan spends far less of that country's national income than does the public sector in this country. 82/ Most of the government spending goes for normal public purposes, such as public works. Moreover, much of Japan's vaunted industrial policy consists merely of hortatory pronouncements with little government action. For example, Japanese subsidies to industry have been so low as to be trivial. To the extent there has been government assistance to industry, that assistance typically has been aimed at chronically weak sectors of Japan's economy such as agriculture, textiles, food processing, and domestic mass transit. Finally, the Japanese automobile industry,

perhaps the most spectacular success of that economy, developed with very little help from the Japanese government. In fact, Japanese automobile manufacturers rejected MITI's scheme to limit the number of competitors.

Moreover, even if the advocates of an industrial policy are able to prove that the Japanese government has been responsible for the Japanese success, that does not necessarily mean that the Japanese experience can readily be transferred here. Their society is significantly different from our own. One example is the difficulty encountered in applying Japanese labor-management techniques in this country.

The results of the various industrial policies in Western European nations might be a better indicator of such a policy's potential here. However, even the policy's advocates cannot seriously argue that government interference has been a ringing success there. France, for example, has adopted the most comprehensive industrial policy, and yet is suffering the most severe economic problems of any Western industrialized country.

Even if subsidies and protectionist policies by foreign governments have been successful in terms of enabling selected industries to capture large market shares, the costs to the economies of those countries and of the world greatly outweigh the benefits. Regardless of the comparative disadvantages and inefficiencies that a domestic industry may face, that industry can be made "competitive," in the sense of lowering sales

price, if the government is willing to provide a sufficiently large subsidy. However, this is hardly a worthy goal. In fact, the United States should be doing everything possible to discourage other countries from adopting such policies rather than embracing them ourselves.

Free trade is the best guarantee of maximizing world wealth. It assures that those countries that have a comparative advantage in the production of some good or service--that is, that can produce that good or service at the lowest cost--will do so. High tariffs impede the promise of efficient resource allocation by prohibiting countries from taking full advantage of their comparative advantage. Subsidies are even more pernicious because they may actually reverse comparative advantages as production moves not to that location where fewest resources are required but rather to the location where subsidies are the greatest.

The subsidizing nations, in obtaining the resources for subsidies, impose substantial resource misallocations on those sectors of their economies which are taxed, both explicitly and implicitly, to generate the subsidies. For example, erecting barriers to imports of one product--say, steel--would allow domestic producers to sell more steel and employ more steel workers. However, simultaneously, those barriers would raise the costs to related industries, such as automobile manufacturing, that must use a great deal of steel and hence

would put those industries at an artificial disadvantage to their foreign competitors. More steelworkers might be employed, but only at a substantial cost in terms of jobs in other industries and in terms of higher prices to the ultimate consumer. By interfering in the market and promoting those industries which, for whatever reason, have the most powerful political constituency, those countries are inhibiting their own economies from adjusting to structural changes and thereby from fully exploiting their own comparative advantage.

Clearly, a free market economy and free trade are not perfect. The market does not respond instantaneously and painlessly to exogenous shocks. However, the free market is far superior to any of the alternatives, including a government directed industrial policy. Quite simply, logic and experience strongly suggest that the free market is a far more efficient and successful mechanism for economic decision-making than is the political mechanism. 83/

Unlike the market, which facilitates the transfer of assets to their most highly valued use, political institutions tend to allocate resources on the basis of the relative electoral strength of competing interest groups. 84/ For example, if the government were called upon to target industries which would then be subsidized and protected from foreign competition, it is likely that a political mechanism would target industries that once enjoyed a comparative advantage which has since

migrated to other countries. Those industries would have large pools of readily identified, organized and mobilized employees, shareholders, and managers who would benefit from targeting and so would use their combined electoral strength to see that the political mechanism responded accordingly. The costs of such targeting, however, would be widely disseminated throughout the economy. And even though collectively those costs might greatly exceed the benefits to the dying industry, the costs might be so dispersed that the burden to any individual would be modest. Political mobilization of the adversely affected citizens would be impossible. As a result, there probably would be no effective countervailing interest group.

Similarly, since it is unclear ex ante who will reap the benefits from the promotion of frontier industries, it is hard to imagine whence the constituency--clearly a prerequisite for targeting--for those new industries would come. Rather than aiding in the development of new industries, it is more likely that an industrial policy would prolong the death of older industries while diverting resources from investment in newer, more promising industries.

Also, the proposals for an industrial policy would entail a bureaucratic mechanism for directing resources--investment capital in particular. As has been explained above, one of the benefits of competition in research and development stems from the fact that the market is allowed to test more than one

idea. 85/ If one competitor follows a strategy or pursues a technology that proves unfruitful, the existence of other competitors to try other strategies minimizes the social cost of that failure. A national industrial policy would almost certainly stifle that competition and raise the size and cost of mistakes.

Those bureaucratic costs are likely to be particularly high. A private party motivated solely by market forces generally will cease further investment once it is clear that the initial investment was a mistake. But a strong constituency with a vested interest in the original political decision might well prevent the government from making such a correction for fear of losing that government subsidy. This concern is hardly fanciful. 86/

Recent large, government investment projects are good examples of the inherent problems associated with government usurpation of the market. The French-British wager on the Concorde is one such example. Fortunately, this country narrowly escaped from a similar folly with the SST. The unavailability of private capital for a superficially attractive project should convey a message about that project's prospects. The general insensitivity of the political mechanism to that message is likely to result in errors that are both massive and enduring, because politicians are slow to confess error and because the original political constituency is likely to be strengthened by the capital infusion.

Fortunately, analysis of the prospects for an industrial policy does not have to be conducted in the vacuum of mere theory. This country tried industrial planning during the 1930s, and the experiment met with failure. The Reconstruction Finance Corporation ("RFC"), the National Recovery Administration ("NRA"), and the Smoot-Hawley Tariff were the vehicles then.

Created in 1932, the RFC provided capital subsidies to targeted industries. Originally, the RFC focused its activities on troubled financial institutions and railroads; however, in 1940, it was expanded to prepare for wartime mobilization. After the war, the RFC was redirected to help the economy readjust to peace. Thereafter, most of its subsidies went to finance veteran-owned businesses and plants purchased as war surplus. These targets seem to have been chosen not on the basis of their future economic promise but rather on the basis of their contemporary political constituency. Most of these businesses could not obtain funding in the capital markets, and at least this author is not aware of any ultimately successful industries that got their start as a result of RFC subsidies. Of course, it is impossible to know what promising industries were handicapped by the lack of capital as a result of the RFC's "crowding-out" of private borrowing. Nonetheless, the RFC eventually became so scandal-ridden that Congress legislated the overgrown bureaucracy out of existence in 1953. 87/

The Smoot-Hawley Tariff represented the country's efforts to use protectionist barriers to foster recovery in the United States. Smoot-Hawley set up the highest general tariff rate structure that the United States had ever experienced and, ultimately, was responsible for dragging the world economy further into depression. More than 30 other countries retaliated, and international debt repudiation became commonplace. United States exports fell from $5.2 billion in 1929 to $1.647 billion in 1933, while imports fell from $4 billion to $1.45 billion over the same period. 88/

For an antitrust practitioner, the National Recovery Administration is perhaps the most interesting and, not surprisingly, disastrous aspect of the experiment with industrial policy. Under the NRA, industrywide codes were developed for over 550 industries. The Codes governed output, prices, wages, and practically every other conceivable aspect of firm conduct on which members of the industry could compete. The Codes were so extensive and detailed that, by the time the Supreme Court found the enabling act unconstitutional, the system of government enforced cartels had largely broken down. By keeping the wage and price levels artifically high and so impeding what otherwise would have been a quicker redeployment of society's resources, the NRA crippled the economy's ability to make the adjustments essential to the climb back to prosperity. 89/

Overall, this country's experiment with industrial policy in the 1930s diverted resources from more efficient deployment and probably prolonged the Great Depression significantly. At least until recently, even the most ardent supporters of the policies of the 1930s would not have cited these programs as significant achievements. 90/

On the other hand, government obviously does have a role. Providing and protecting the legal framework within which the market operates is one example. The modifications of that framework proposed in section I of this paper are important examples of ways that government policy can play a constructive role in improving productivity and competitiveness. The framework should be designed so as to be conducive to economy-wide development of technology and improvement of productivity, at the same time that it is neutral toward investment in any particular industry.

National security is another important area in which an "industrial policy" may be appropriate. The federal government probably should preserve certain critical industries at some level of activity to protect against uncertain foreign supply in a time of national emergency. Only the government can provide for national defense, and defense policy has a role beyond the mere procurement and deployment of weapons and military personnel. Nevertheless, protectionist measures will rarely be the most cost-effective means for achieving national security goals.

There are other areas as well where government policy, both at the state and federal level, can improve productivity and help to achieve other social goals. For example, education, basic research, foreign relations, and fiscal and monetary policies all have a profound effect on productivity. In deciding precisely what role government should play, however, one must recognize the severe and inherent limitations on the effectiveness of government interference in the market. Government intervention can only be justified by establishing the existence of a significiant market failure, whose costs if unchecked would exceed the costs associated with the proposed interference in the market. The case for an overwhelming market failure that would justify the costs of an industrial policy quite simply has not been made. Moreover, none of the advocates of industrial policy have confronted, much less overcome, the historical precedents that strongly suggest their "program" is doomed to failure.

Conclusion

This country currently faces decisions that will be crucial to our ability to maintain international economic preeminence. The industries of other countries are challenging the superior position traditionally enjoyed by United States industry in international markets and this country's rate of growth of productivity has not kept pace with the rate of many of our

other major trading partners. However, there is no cause for panic; rather, it is essential that we approach the issue calmly and analytically and determine what problems exist and how they can best be addressed.

One area in which this country might take action to induce greater innovation and productivity involves the relationship between the antitrust laws and R&D. The substantive standard embodied in the federal antitrust statutes is not an impediment to promoting innovation, efficiency, and productivity. In fact, those statutes were designed to ensure that the market performs in a manner that is conducive to improvements in consumer welfare. Nevertheless, overly punitive sanctions and judicial misinterpretation of the proper antitrust standard may be having an adverse effect on productivity.

Although the deterrent effect that the antitrust laws have on efficiency-enhancing joint R&D has been greatly exaggerated, the modicum of uncertainty surrounding the analysis employed by the antitrust laws, combined with the excessively punitive antitrust remedy of mandatory treble damages, may inhibit the formation of some procompetitive joint R&D ventures. More damaging to the economy's efforts to create and exploit new technologies, however, is the judicial and enforcement hostility that has been manifested toward intellectual property. The antitrust laws and the patent and copyright doctrines of misuse have been misconstrued to the point that they impede the efficient exploitation of the fruits of R&D.

Not only has this hostility impaired short-term efficiency, but it may well have also adversely affected the incentives to invest in R&D by reducing the overall returns to intellectual property. Fortunately, a few, relatively minor modifications of the antitrust laws, as well as a change in the doctrines of patent and copyright misuse, should be sufficient to correct these problems and improve the legal climate for procompetitive R&D-related conduct, while at the same time maintaining the traditional antitrust standard to ensure that anticompetitive practices are not allowed to reduce efficiency and productivity.

The more drastic solutions recommended by the advocates of a national industrial policy, on the other hand, are more likely to harm than to enhance this country's competitiveness and productivity. An industrial policy would entail the unjustified replacement of the market's economic mechanism for allocating resources with a bureaucratic one. By exaggerating the success of industrial policies adopted by other countries and by ignoring this country's own disastrous experience with similar policies, the advocates of such a policy have been able to avoid coming to terms with the strong evidence that a national industrial policy is doomed to failure. The free market and international free trade are the best guarantees for a strong and vital economy. To the extent that one advocates government intervention in the market, especially when the intervention is as extensive as that contemplated by a national industrial policy, he has a significant burden of establishing a severe market failure, the costs of which clearly outweigh the costs of the advocated intervention. The advocates of wholesale government intervention in the guise of an industrial policy simply have not carried that burden.

FOOTNOTES

* Assistant Attorney General, in charge of the Antitrust Division, U.S. Department of Justice.

1/ See, e.g., COMMITTEE FOR ECONOMIC DEVELOPMENT, STIMULATING TECHNOLOGICAL PROGRESS 19-25 (1980).

2/ See BUSINESS-HIGHER EDUCATION FORUM, AMERICA'S COMPETITIVE CHALLENGE: THE NEED FOR A NATIONAL RESPONSE 8-9, 36 (1983); NATIONAL ACADEMY OF SCIENCES, ANTITRUST, UNCERTAINTY, AND TECHNOLOGICAL INNOVATION (1980); NATIONAL RESEARCH COUNCIL, TECHNOLOGY, TRADE, AND THE U.S. ECONOMY (1978).

3/ See, e.g., NATIONAL ACADEMY OF SCIENCES, supra note 2, at 26-29.

4/ As used in this paper, the phrase, "antitrust statutes," refers to the federal antitrust laws, i.e., the Sherman Act, the Clayton Act, and the Federal Trade Commission Act, 15 U.S.C. 1 et seq.

5/ E.g., Reiter v. Sonotone Corp., 442 U.S. 330, 343 (1979), quoting R. BORK, THE ANTITRUST PARADOX 66 (1978) (the antitrust laws are a "consumer welfare prescription"). See also Baxter, Responding to the Reaction: The Draftsman's View, 71 CALIF. L. REV. 618, 619-21 (1983).

6/ See generally Arrow, Economic Welfare and the Allocation of Resources for Invention, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY, 609-25 (1962) and Demsetz, Information and Efficiency: Another Viewpoint, 12 J.L.& ECON. 1 (1969).

7/ Arrow, supra note 6, at 610-14.

8/ "Information impactedness" is a term used to describe the situation in which there are informational asymmetries among parties to a transaction and those informational asymmetries prove difficult to rectify. Professor Oliver Williamson describes the term as follows:

> "It is attributable to the pairing of uncertainty with opportunism. It exists in circumstances in which one of the parties to an exchange is much better informed than is the other regarding underlying conditions germane to the trade, and the second party cannot achieve information parity except at great cost--because he cannot rely on the first party to disclose the information in a fully candid manner."

O. WILLIAMSON, MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS 14 (1975). See also Arrow, supra note 6, at 612-13.

9/ Moreover, "adverse selection" problems will make it difficult to pool the risks. That is, because the third party risk-assumers cannot easily differentiate among the various abilities of inventors, the risk-assumers may attempt to charge a risk premium that reflects the average ability of inventors. A number of inventors with above-average ability (the number will depend on the risk aversion of those inventors) will leave the pool. As the above-average risks leave the pool, the pool's average declines, increasing the number of above-average inventors with an incentive to leave the pool. At the limit, only the least able inventors will be left in the pool. See O. WILLIAMSON, supra note 8, at 14.

10/ This phenomenon is referred to in the literature as the "moral hazard." While adverse selection involves ex ante informational asymmetries that are present at the time of negotiation, the moral hazard is an ex post asymmetry. That is, the third party risk-assumer will find it costly to determine the intent and motivation of the party from whom the risk was assumed. Ceteris paribus, higher risk premia will be charged to assume risks which the insured's conduct can affect than to assume risks over which the insured has little or no control. See, id.

11/ See Arrow, supra note 6, at 614-16; Demsetz, supra note 6, at 9-11.

12/ See Arrow, supra note 6, at 616-19; Demsetz, supra note 6, at 11-12.

13/ In other words, information is subject to problems of indivisibilities of use (or, as it is commonly referred to, public goods). For a discussion of public goods, see A. ATKINSON & J. STIGLITZ, LECTURES ON PUBLIC ECONOMICS 483-89 (1980); Samuelson, The Pure Theory of Public Expenditure, 36 REV. ECON. & STAT. 387 (1954).

14/ In criticizing Professor Arrow's concern that positive prices are charged for the use of information, Professor Demsetz notes that "[i]ndivisibilities in the use of knowledge become important only when the costs of contracting are relatively large. . . . If the cost of contracting were zero, . . . prospective 'free-loaders' would be willing to pay researchers to increase the investment being made. Research activity would be purchased just as any other good." Demsetz, supra note 6, at 12. As Professor Demsetz notes, a system of intellectual property provides an efficient mechanism for approaching the welfare-maximizing level of research that would be realized in a zero-transactions-cost world. Id. at 13.

15/ The problems associated with reliance on a political mechanism to allocate resources are discussed more fully in part II of this paper, infra.

16/ The patent laws, for example, give a patentee the right to exclude others from making, using, or selling the patented invention throughout the United States for a period of seventeen years. 35 U.S.C.§ 154. This right is derived from the Constitution, which states that, "[t]o promote the progress of science and useful arts," Congress shall have the power to "secure for limited times to authors and inventors the exclusive right to their respective writings and discoveries." U.S. CONST., art. I, § 8.

17/ In this sense, patent rights are a solution to some of the transactions-cost problems that would obtain in the absense of legally protected rights. Bargaining in information involves problems of opportunism and ex ante asymmetries--the owner has the information that another wants to obtain. Until the information is divulged to the potential purchaser, it generally will be impossible for the purchaser to determine his reservation price (i.e., what the information is worth to him). However, once the information is divulged to the potential purchaser, an ex post information asymmetry arises--the purchaser now knows his reservation price, but it will be costly for the owner to determine that price. Unless the owner of the information has right to prevent the potential purchaser from using the information, the owner is at the mercy of the purchaser, who, depending on the extent to which the information has been divulged, may need nothing more from the owner and so may be willing to pay little or nothing. A defined patent right avoids this information asymmetry and so lowers bargaining costs. Cf. O. WILLIAMSON, supra note 8.

18/ See, e.g., Citizen Publishing Co. v. United States, 394 U.S. 131 (1969); Timken Roller Bearing Co. v. United States, 341 U.S. 593, 598 (1951); United States v. Minnesota Mining & Mfg. Co., 92 F. Supp. 947 (D. Mass. 1950); Brodley, The Legal Status of Joint Ventures Under The Antitrust Laws: A Summary Assessment, 21 ANTITRUST BULL. 453 (1976). But see Broadcast Music, Inc. v. CBS, 441 U.S. 1 (1979).

19/ United States v. Line Material Co., 333 U.S. 287, 310 (1948); Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263, 301 (2d Cir. 1979), cert. denied, 444 U.S. 1093 (1980); L. SULLIVAN, HANDBOOK OF ANTITRUST LAW, 303 (1977). Ginsburg, Antitrust, Uncertainty, and Technological Innovation, 24 ANTITRUST BULL. 635, 672 (1979).

20/ In Berkey, the appellate court, applying a rule of reason, upheld the district court's finding that a joint development venture involving a monopolist was illegal. 603 F.2d at 298-304. See also Ginsburg, supra note 19, at 671; Note, Joint Research Under the Antitrust Laws, 39 GEO. WASH. L. REV. 1112, 1123 (1973).

21/ See the discussion, supra at notes 8-10.

22/ An excellent summary of the debate and the empirical data can be found in Weiss, The Concentration-Profits Relationship and Antitrust in INDUSTRIAL CONCENTRATION: THE NEW LEARNING 184 (H. Goldschmid, H. Mann & J. Weston eds. 1974).

23/ U.S. DEPARTMENT OF JUSTICE, MERGER GUIDELINES (Antitrust Division June 14, 1982) [hereinafter referred to as MERGER GUIDELINES]. See also Baxter, supra note 5, at 618.

24/ See generally U.S. DEPARTMENT OF JUSTICE, ANTITRUST GUIDE CONCERNING RESEARCH JOINT VENTURES (Antitrust Division November 1980) [hereinafter referred to as JRDV GUIDES].

25/ An example might be the development of new brake systems for automobiles.

26/ See the discussion at pp. 17-18, infra.

27/ JRDV GUIDES, supra note 24, at 3.

28/ See generally F. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 413-38 (2d. ed. 1980). Professor Scherer notes that "[t]he more rivals an industry includes, the more independent centers of initiative there are, and the more likely it is that some entrepreneurs will consider the development of a product worthwhile." Id. at 428-29.

29/ See id. On the other hand, it does not appear that atomistic competition is an ideal market structure for R&D. Id.; Ginsburg, supra note 19, at 644. This is true because the greater the number of competitors the lesser is the discounted value of the expected returns to an investment in R&D for any particular competitor. Joint ventures can help to counteract this effect by reducing risk.

Moreover, commentators generally assume that there is an inverse relationship between the number of competitors and an inventor's ability to appropriate the benefits generated by his invention. See, e.g., SCHERER, supra note 28, at 429-30. Of course, institutions of intellectual property are designed to ameliorate the effect that a competitive market structure has on an inventor's ability to appropriate the returns to R&D. To the extent intellectual property fulfills its function, one need not be as concerned about the adverse effect of vigorous competition on innovation.

30/ See United States v. Automobile Mfgs. Assn., 307 F. Supp. 617 (C.D. Cal. 1969), aff'd sub nom. City of New York v. United States, 397 U.S. 248 (1970); JRDV GUIDES, supra note 24, at 12-13. But see R. POSNER, ANTITRUST CASES, ECONOMIC NOTES AND OTHER MATERIALS 319-20 (1974). Judge Posner argues that the disincentive to install auto emissions devices would be decreased if all competitors agreed to do so simultaneously.

31/ See the discussion supra at note 18-20. See also JRDV GUIDES, supra note 24.

32/ The MERGER GUIDELINES, supra note 23, set out the appropriate analysis of market definitions and market share calculation in the context of merger analysis. The analysis that follows uses the MERGER GUIDELINES as a starting point.

33/ See generally MERGER GUIDELINES, supra note 23, § II.

34/ See the discussion supra at pp. 12-14.

35/ To define markets in the context of merger analysis, the MERGER GUIDELINES supra note 23, look both to demand and supply substitutability. To determine the products that are competitive substitutes to the products of the merging parties, the GUIDELINES add "additional products to the market if a significant percentage of the buyers of products already included [in the provisional market] would be likely to shift to those other products in response to a small but significant and non-transitory increase in price." Id. at 4. As explained below, the question of demand substitutability may frequently be speculative in the context of joint R&D ventures, and, hence, there must be greater reliance on use of the concept of supply substitutability.

36/ The discussion here is analogous to the discussion in MERGER GUIDELINES, supra note 23, of supply or production substitutability. The MERGER GUIDELINES include in the market firms that "could easily and economically be used to produce and sell the relevant product within six months in response to a small but significant and non-transitory increase in price." Id. at 6. Because the anticompetitive effect of joint R&D ventures does not manifest itself quickly, the six-month limitation in the case of mergers should be extended in the case of joint R&D ventures (the period of extension will vary depending on the circumstances). Also, because "price" is not an easily understood concept in the context of R&D, it is more appropriate to focus on the response of firms to an increase in the returns to R&D.

37/ See generally MERGER GUIDELINES, supra note 23, § II(C).

38/ See generally id., § II(D).

39/ See the discussion, supra at notes 28-29.

40/ Address by William F. Baxter to the National Association of Manufacturers 12 (May 10, 1983). Of course, as with any number of this sort, it should not be viewed as totally inflexible. For example, a 20 percent market share might not, under certain circumstances, raise any concern, while 14 percent might. Some flexibility may be necessary because of the problems inherent in calculating market shares for R&D.

41/ This general approach is discussed in greater detail in W. BAXTER, P. COOTNER, & K. SCOTT, RETAIL BANKING IN THE ELECTRONIC AGE: THE LAW AND ECONOMICS OF ELECTRONIC FUNDS TRANSFER, ch. 5 (1977).

42/ Id.

43/ Cf. United States v. Terminal R.R. Ass'n, 224 U.S. 383 (1912)

44/ This perception has no doubt developed from cases holding group boycotts per se illegal. Id.; Associated Press v. United States, 326 U.S. 1 (1945); Silver v. New York Stock Exchange, 373 U.S. 341 (1963). See also JRVD GUIDES, supra note 24, at 21-24; Brodley, The Legal Status of Joint Ventures Under the Antitrust Laws: A Summary Assessment, 21 ANTITRUST BULL. 453, 468-69 (1976). But see United States Trotting Ass'n v. Chicago Downs Ass'n, 665 F.2d 781 (7th Cir. 1981).

44a/Although the government can sue to enjoin an overinclusive joint venture, the risk of such a suit has less of an adverse financial impact than treble damages because, other than breaking up the anticompetitive venture, the injunction will not necessarily impose substantial costs on the individual joint venturers.

45/ See F. SCHERER, supra note 28, at 411. Scherer divides innovation into four stages: invention, entrepreneurship, investment, and development. All four stages require the development of information upon which competitors can "free-ride."

46/ The effort required to develop the technology for the Xerox copier provides a good example. After the invention of the electrostatic principle on which the copying machine is based, it was yet necessary to produce the paper feed and transport system, ink metering mechanism, exposure timer, and the myriad of other features that were required to manufacture a marketable copier. The time attributable to these efforts can be very lengthy. One study lists 50 famous inventions and the corresponding delay periods, which range from 2 to 68 years. Kitch, The Nature and Function of the Patent System, J.L. & ECON. 265, 272 (1977). Another study estimates an average delay of 10 to 15 years for 46 inventions in a variety of industries. E. MANSFIELD, INDUSTRIAL RESEARCH AND TECHNOLOGICAL INNOVATION 110, 202-03 (1968).

47/ O. WILLIAMSON, supra note 8, at 9, 26-30. For another discussion of the problems of bilateral monopoly see Arrow, The Organization of Economic Activity in THE ANALYSIS AND EVALUATION OF PUBLIC EXPENDITURE: THE PPB SYSTEM, Joint Economic Committee, 91st Cong., 1st Sess. 59-73 (1969).

48/ The description of metering was first published in Director and Levy, Law and the Future: Trade Regulation, 51 NW. U.L. Rev. 281 (1956).

49/ See E. SINGER, ANTITRUST ECONOMICS AND LEGAL ANALYSIS 106 (1981).

50/ See, e.g., Dawson Chemical Co. v. Rohm & Haas Co., 448 U.S. 176 (1980).

51/ See, e.g., Priest, Cartels and Patent License Arrangements, 20 J.L. & ECON. 309 (1977).

52/ See generally Continental TV, Inc. v. GTE Sylvania, Inc., 433 U.S. 36 (1977).

53/ See, e.g., United States v. Line Material, Inc., 333 U.S. 287 (1948); Mercoid Corp. v. Mid-Continent Co., 320 U.S. 661 (1944); Ethyl Corp. v. United States, 309 U.S. 436 (1940); Carbice Corp. v. American Patent Development Co., 283 U.S. 27 (1931); Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502 (1917).

54/ Mercoid Corp. v. Mid-Continent Co., 320 U.S. at 665.

55/ Id.

56/ United States v. Studiengesellschaft Kohle, m.b.H. 670 F.2d 1122, 1127 (D.C. Cir. 1981).

57/ Ginsburg, supra note 19, at 678.

58/ Henry v. A.B. Dick Co., 224 U.S. 1 (1912); Heaton-Peninsula Button-Fastener Co. v. Eureka Specialty Co., 77 F. 288 (1896).

59/ See, e.g., International Salt Co. v. United States, 332 U.S. 392 (1947), Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502 (1917). However, tie-ins can be justified if (1) a seller offers a new technology that cannot succeed unless all of its components function correctly; see, e.g., United States v. Jerrold Electronics Corp., 187 F. Supp. 545, 555-58, 560-61 (E.D. Pa. 1960), aff'd per curiam, 365 U.S. 567 (1961); General Talking Pictures Corp. v. American Tel. & Tel. Co., 18 F. Supp. 650, 666-67 (D. Del. 1937); or (2) a seller, to maintain quality control or to preserve goodwill, must prevent buyers from utilizing inferior complementary goods with the seller's product; see, e.g., Kentucky Fried Chicken Corp. v. Diversified Packaging Corp., 549 F.2d 368 (5th Cir. 1977); Baker v. Simmons Co., 307 F.2d 458, 469 (1st Cir. 1962)

60/ The other two conditions are that there is an agreement actually conditioning the sale of one item (the "tying product"), on the purchase of a second item (the "tied product"), and that the arrangement must affect a "not insubstantial amount" of commerce. International Salt Co. v. United States, 332 U.S. 392, 396 (1947); Fortner Enterprises, Inc. v. United States Steel Corp., 394 U.S. 495, 501-02 (1969).

61/ See, e.g., United States v. Loew's, Inc., 371 U.S. 38, 46 (1962).

62/ United States v. General Electric Co., 272 U.S. 476 (1926) held that it is not per se illegal for a patentee to set the resale price of a patented product that it has sold to a licensee. Subsequent cases have eroded this aspect of the General Electric decision, and patentees currently are reluctant to rely upon General Electric for fear that it would be overruled if tested. See, e.g., United States v. Line Material, 333 U.S. 287 300-01 (1948); NORDHAUS, PATENT-ANTITRUST LAW, § 33 (1982).

63/ See, e.g., Transparent-Wrap Machine Corp. v. Stokes & Smith Co., 329 U.S. 637 (1947) reh'g denied, 330 U.S. 854 (1947); Nordhaus, Patent-Antitrust Law, § 58.

64/ Prior to Continental TV, Inc. v. GTE Sylvania, Inc., 433 U.S. 36 (1977) a number of cases indicated a rule of per se illegality for field-of-use and other restrictions placed on a licensee that purchased the product. See, e.g., United States v. Glaxo Group Ltd., 302 F. Supp. 1 (D.D.C. 1969), rev'd on other grounds, 410 U.S. 52 (1973). The rationale of GTE Sylvania, however, strongly indicates that field-of-use and territorial restrictions in intellectual property licenses would today be judged under the rule of reason. Indeed, in Munters Corp. v. Burgess Industries Inc., the court first held that a field-of-use restriction was per se illegal, 450 F. Supp. 1195 (S.D.N.Y. 1977), but reversed itself after GTE Sylvania, 1978-2 Trade Cas. ¶ 62,149 (S.D.N.Y.). (The court, however, held the restriction to be illegal under the rule of reason.) Accord, United States v. Studiengesellschaft Kohle, m.b.H., 670 F.2d 1122 (D.C.Cir. 1981).

65/ Thus, in United States v. Studiengesellschaft Kohle, m.b.H., 670 F.2d 1122 (D.C. Cir. 1978), even though the court applied a rule of reason and upheld the validity of the licensing restrictions at issue, its analysis was replete with improper notions concerning intellectual property and its relationship to the antitrust laws. Particularly ominous in this regard is the court's repeated focus on whether the license restriction has the danger of extending the "patent monopoly." Id. at 1131-35.

66/ Remarks of Bruce Wilson, Department of Justice Luncheon Speech, "Law on Licensing Practices: Myth or Reality?" (January 21, 1975).

67/ Dkt. 9108 (April 5, 1978), 4 Trade Reg. Rep. (CCH) ¶ 23,613 (September 4, 1979) (dismissal by ALJ) (titanium dioxide).

68/ Dkt. 8908, Trade Reg. Rep. (CCH) FTC Complaints and Orders 1970-73 Transfer Binder at ¶ 20,164 (electrostatic copying).

69/ See, e.g., Remarks of Abbott B. Lipsky, before the American Bar Association Antitrust Section "Current Antitrust Division Views on Patent Licensing Practices" (November 5-6, 1981); Remarks of Roger B. Andewelt before the Houston Patent Law Association "Basic Principles to Apply at the Patent-Antitrust Interface" (December 3, 1981).

70/ See Remarks of Roger B. Andewelt before the Patent, Trademark and Copyright Section of the Bar Association for the District of Columbia, "Competition Policy and the Patent Misuse Doctrine" (November 3, 1982), for a general description of the misuse doctrine and its development.

71/ National Lockwasher Co. v. George K. Garrett Co., 137 F.2d 255 (3d Cir. 1943); McCullough v. Kammerer Corp., 166 F.2d 759 (9th Cir.), cert. denied, 335 U.S. 813 (1948).

72/ Zenith Radio Corp. v. Hazeltine Research, Inc., 395 U.S. 100, on remand, 418 F.2d 21 (7th Cir. 1969), rev'd, 401 U.S. 321, reh'g denied, 401 U.S. 1015 (1971).

73/ Id.

74/ See, e.g., Brulotte v. Thys Co., 379 U.S. 29 (1964).

75/ Laitram Corp. v. King Crab Inc., 244 F. Supp. 9, modification denied, 245 F. Supp. 1019 (D. Alaska 1965).

76/ Allied Research Products, Inc. v. Heatbath Corp., 300 F. Supp. 656 (N.D. Ill. 1969).

77/ American Photocopy Equipment Co. v. Rovico, Inc., 359 F.2d 745 (7th Cir. 1966).

78/ The approach described below is outlined in the Statement of William F. Baxter on S. 737, S. 568, and S. 1383, Bills Related to Joint Research and Development before the Senate Committee of the Judiciary, 98th Cong., 1st Sess. (June 29, 1983).

79/ See, e.g., S. 737, S. 568, and S. 1383, 98th Cong., 1st Sess. (1983).

80/ Although there have been numerous proposals for a national industrial policy, the most prominent recent proposal can be found in R. REICH, THE NEXT AMERICAN FRONTIER (1983). See also, HIGH TECHNOLOGY: PUBLIC POLICIES FOR THE 1980s (National Journal Issues Book 1983).

81/ For a more detailed analysis of the role of the Japanese government in Japan's economic success, see Trezise, Industrial Policy in Japan in INDUSTRY VITALIZATION: TOWARD A NATIONAL INDUSTRIAL POLICY (19832). This part of the paper has drawn heavily on that analysis and on the Remarks of James C. Miller III before the Economic Club of Detroit, "Reindustrialization Policy: Atari Mercantilism" (April 18, 1983).

82/ For example, in 1973, the government spent only 29 percent of Japan's national income, while the government here spent 40 percent of this country's national income. See G.W. NUTTER, GROWTH OF GOVERNMENT IN THE WEST at 6, 58-73 (1978).

83/ For a general defense of the free-market and an analysis of the inherent weaknesses of central planning, see Hayek, The Use of Knowledge in Society, 35 AM. ECON. REV. 519 (1945). See also Brennan, Municipal Antitrust Liability--An Economic Perspective 2-4 (Economic Policy Office, U.S. Department of Justice, Discussion Paper No. 83-9 1983).

84/ See generally R. NOLL, GOVERNMENT POLICY AND THE PRODUCTIVITY PREDICAMENT (Cal. Tech. Social Science Working Paper No. 430 1982).

85/ See the discussion, supra at notes 28-29.

86/ For some examples of the adverse effects of government interference in the market for R&D, see R. NOLL, supra note 84.

87/ For a description of the RFC, see B. MITCHELL DEPRESSION DECADE: FROM NEW ERA THROUGH NEW DEAL, 1929-1941, 76-78, 177 (Vol. IX, The Economic History of the United States) reprinted by M.E. Sharpe, Inc., White Plains, N.Y.; FAINSOD AND GORDON GOVERNMENT AND THE AMERICAN ECONOMY 716-17 (Rev. Ed. 1948); CONGRESSIONAL QUARTERLY, CONGRESS AND THE NATION, 1945-64, at 350, 362-63.

88/ See DOBSON, TWO CENTURIES OF TARIFFS: THE BACKGROUND AND EMERGENCE OF THE U.S. INTERNATIONAL TRADE COMMISSION 33-5, (1976); The Rise and Fall of the United States in the World Economy, in THE BUSINESS CYCLE AND PUBLIC POLICY, 1929-80 (a compendium of papers submitted to the Joint Economic Committee, Congress of the United States), Joint Committee Print, 96th Cong. 2d Sess 68 (November 28, 1980); FAINOD and GORDON, supra note 87, at 90-91; and LARY and ASSOCIATES, THE UNITED STATES IN THE WORLD ECONOMY: THE INTERNATIONAL TRANSACTIONS OF THE UNITED STATES DURING THE INTER-WAR PERIOD, 171-72 (1943).

89/ NRA's enabling statute, the National Industrial Recovery Act, was held unconstitutional in Schecter v. United States, 295 U.S. 495 (1935). For a description of the NRA, see B. MITCHELL, supra note 87, at 228-59.

90/ In addition to our experience with industrial policy in the 1930s, this country also tried massive government interference in the market in the early 1970s. At that time, the Federal Government adopted a comprehensive incomes-policy of wage and price controls to slow inflation. That policy also generally failed and was ultimately abandoned as a bad idea. See, e.g., ECONOMIC REPORT OF THE PRESIDENT, 226-29 (1975).

Representative LUNGREN. It seems to me that one of the things that probably would be most limiting in terms of a business person's decision to get involved in an area that is somewhat gray in the law with respect to antitrust, and joint research and development, would be the potential downside risk involved. In the area of antitrust, we are talking about treble damages. Do you see the treble-damage aspect of the antitrust law as a particular deterrent at present to the area that we are talking about now, joint research and development, particularly in high tech?

Mr. BAXTER. Yes, I do. And as you know, the bill that we have sent up to the Congress would eliminate treble damages. I see it as an even greater deterrent to the administration of licensing programs after the fruits of R&D are in hand and you have your patents.

The other body of antitrust case law that I referred to, which involves the interface between the antitrust laws and the patent laws, makes undertaking a licensing program very, very dangerous. I would say, again, I just cannot overstress the importance, in my view, of Congress enacting title III —and I would say also titles IV and V, but particularly title III—of this legislation. Because in my view, the deterrence to R&D is much more the inability of companies to exploit what they have created after they have created it rather than their inability to form joint ventures beforehand.

Representative LUNGREN. One of the reasons I want to focus on that is there are different approaches in the bills. Some have safe harbors, some do not. Some mention criminal liability, some do not.

In viewing that, with the controversies there, I sometimes feel we lose sight of the strong deterrent that treble damages creates. It is a deterrent that is appropriate in certain circumstances. But we may want to draw this very narrowly defined special case where we want to allow joint R&D but also protect against the abuse of it for noncompetitive purposes by allowing a penalty to remain. A penalty that is prescribed to the actual conduct as opposed to tripling whatever that damage would be, would seem to me to be something we ought to take a look at, rather than going all or nothing as some bills in my judgment may do.

Mr. BAXTER. Yes; as you can see from our bill, we are enthusiastic about getting rid of the treble damage penalty. I would be content to see all private damage remedies go, so that only Government intervention and possibly private injunctive action would remain, but I sensed a great deal of resistance in the Congress to completely eliminate all damage remedies. I don't think keeping a single remedy would pose very serious deterrence to joint R&D activity, but I certainly agree we should get rid of the treble damage liability in this area.

I do not think it is necessary to say anything about criminal liability, Congressman. The idea of our bringing a criminal case against someone who has formed a joint research and development project—unless it was the most transparent sham of an old-fashioned cartel—and I suppose one cannot rule that out—bringing a criminal case would be totally unthinkable.

My own preference would be not to say anything about the criminal case because then, if we got that transparent sham for classical cartel behavior, we wouldn't have to fight our way past that provision. But I do not think any lawyer would seriously suggest that the threat of

criminal liability deterred an effort to form any bona fide joint R&D effort.

Representative LUNGREN. I agree with your analysis of policy so long as you are at the Justice Department. I am somewhat concerned about who may be there in the future, once we have taken away the treble damages. That is the hammer they have that is very strong now, it appears to me.

Mr. BAXTER. But that is a private hammer. That is not a hammer that is available to the Justice Department.

Representative LUNGREN. I understand that. But if that is eliminated, the biggest hammer you would have may just go over to the criminal. I understand what you are saying. It would be a new world we would be creating in a sense.

Mr. BAXTER. Congressman, I have been very critical of some of my predecessors, but I am prepared to say today that not one of my predecessors, going back to the early 1950's when I first became a student in this area, would conceivably have brought a criminal action under those circumstances.

Representative LUNGREN. Mr. Baxter, I want to thank you for taking the time to appear before us. Your testimony has been very helpful, and the discussion paper [1] that we will include in the record from your presentation at the University of San Diego will also be helpful to us. I thank you very much.

Mr. BAXTER. Thank you very much, Congressman Lungren.

Representative LUNGREN. Welcome, gentlemen of the panel. We have all your prepared statements, and they will be entered into the record as a matter of course. You may proceed as you wish. What I would like to do is to perhaps limit your opening statements to 10 minutes apiece, and then we can get into questions and answers, and an exchange of ideas here.

Let me just start from my left to right with Mr. Charles Herz, General Counsel of the National Science Foundation.

STATEMENT OF CHARLES H. HERZ, GENERAL COUNSEL, NATIONAL SCIENCE FOUNDATION

Mr. HERZ. Thank you, Congressman Lungren.

The interest of the National Science Foundation in today's subject stems from our overriding interest in the health and vitality of the Nation's science and technology enterprise. We are inclined to believe that R&D joint ventures could play a larger role in that enterprise, and potentially a very important one, in years to come. Antitrust anxiety, whether or not warranted, does still seem a deterrent to the formation of such joint ventures, and we think that relatively minor changes in the antitrust law could ease that anxiety.

In general I think it would be fair to say that our position corresponds pretty extensively with what you have just heard from Mr. Baxter, formed, however, independently before the administration bill was released and submitted to Congress.

What is most needed, in our view, is a clear signal to the businessmen, the lawyers, that Government sees R&D joint ventures as likely to serve the interests of the public and unlikely to harm competition.

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[1] See discussion paper beginning on p. 54.

Such a signal could ease antitrust anxiety and allow businessmen to consider these R&D joint ventures on their economic merits.

We do not think legislation to remove the antitrust deterrent needs to impose detailed requirements on the forms such ventures can assume or the activities they can undertake. In particular, we agree that compulsory licensing is a very poor idea. We do not think the legislation needs to require Government involvement and approval before R&D joint ventures can proceed. That is, we do not think there is a need for precertification by Justice.

I would also like to endorse briefly what Mr. Baxter said about the need for improvement in the antitrust and intellectual property laws that bear on the value of patents and copyrights that arise from R&D, whether the R&D is joint or separate.

One set of those improvements would insure that licensing practices are not condemned as anticompetitive or a misuse of intellectual property protections without economic evidence and analysis. The fact is that such practices may actually stimulate competition and benefit consumers. Condemning them summarily, as the courts have sometimes tended to do, limits the value of intellectual property and so weakens the incentive to create or exploit it; namely, the incentive to do R&D in the first place.

Another improvement would close a patent law loophole. When a commercial or industrial process is patented in the United States, the patent does not stop someone from using the patented process in another country to make products that are then imported back into the United States royalty free. Why should we allow that? Other countries do not.

Since your focus today is on antitrust and R&D joint ventures, I will leave that subject. We really do hope, though, that the licensing and process patent provisions of the administration bill will get equally close and speedy attention in the Congress.

We see R&D joint ventures as one among several mechanisms that are available to protect against underinvestment in commercially relevant R&D. Our industries need to invest enough in R&D and need to direct that investment effectively to compete successfully with competitors in Japan, Europe, and elsewhere. We cannot sensibly focus only on competition within a U.S. industry. Competition between that industry and the industries of other countries may be equally important.

We think the danger of underinvestment in R&D is real. It stems from two interrelated problems. One is that high-cost, high-risk projects, that are worthwhile for an entire industry or for the economy as a whole, can be beyond the risk-bearing or self-insuring capacity of individual companies. The other is that an individual company may be unable to appropriate to itself a sufficient share of the fruits from its R&D investments.

Intellectual property protections help with this second problem, but do not eliminate it.

Federal support of fundamental science and engineering research in Government and university laboratories is, of course, very largely a response to the likely underinvestment in R&D caused by these problems. Supporting that kind of research is our primary business at the National Science Foundation. It has been enormously fruitful for the United States, and never more so than recently. In development of industrial technology, however, government-supported fundamental research does well, primarily as a supplier of generically applicable knowledge and techniques. It lacks, in particular, the close coupling with production and marketing realities and the spur of competition that are the strengths of the corporate R&D lab.

Now, between the corporate R&D, where the incentive may be insufficient, and the Government-supported fundamental R&D, where the close coupling of production and marketing and the spur of competition are lacking, there is a middle ground—hard to characterize, but typified by the frontier science or technology that promises broad commercial application and value in 5, 10, or 15 years, but still poses great risk for an individual company. R&D joint ventures are one of several mechanisms by which we can help insure that the United States invests adequately in that middle ground.

In my prepared statement, I go into a number of the other mechanisms such as a few corporate R&D laboratories, like Bell Laboratories, that can go into and even cross that middle ground. There is mention of the small companies that are spun off from university research, as in Silicon Valley or Route 128, and many other places around the country. There is mention of the limited, but still significant, industry associated R&D activities and of industrywide R&D consortia like the Electric Power Research Institute. Industry-university collaboration, similarly, had been a weak point in our national science and technology enterprise until very recently. With some impetus from the NSF and considerable impetus from industry, I think that is changing very rapidly, so that industry-university research seems now to be flourishing.

We see the recent increased interest in R&D joint ventures as another part of the same picture. It derives from the same increased awareness that in an era of accelerating technology development, increasingly complex and costly R&D, and heightened international competition, the United States and specific U.S. industries need to be concerned about R&D that a typical corporation cannot take on alone.

In my prepared statement, I go into the advantages of joint R&D ventures for the companies and industries involved, and for the country. I will not go into all that detail because I think the subject has been covered well by Congressman Zschau and other witnesses.

Despite all those advantages, though, R&D joint ventures among U.S. companies have been sparse, at least until very recently. Between 1977 and 1979, the most recent years for which we have information, a study based on published reports of joint ventures identified only 21 joint R&D ventures with no production or marketing components.

Some others might have gone unpublicized and the numbers have likely increased in the last 2 or 3 years. Even so, that is quite a small number.

So why are there so few? There are purely economic reasons of considerable and possibly overriding importance. There is also the natural inclination of an institution to stay at home, a variation of the "not invented here" syndrome. I think that is probably an obstacle. But it is clear that antitrust fears are also a significant deterrent. That is the preliminary finding of a Yale group's current research on R&D joint ventures that we have been supporting. I have with me a copy of a summary report they prepared for us and would be glad to submit it for the record.

Representative LUNGREN. That would be fine.

[The information referred to follows:]

Yale University

DEPARTMENT OF ECONOMICS

37 Hillhouse Avenue
P.O. Box 1972
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RICHARD C. LEVIN
Professor of Economics
and Management

September 6, 1983

Dr. Carole Kitti
Policy Analyst
Division of Policy Research and Analysis
National Science Foundation
Washington, DC 20550

Dear Carole:

I enclose a memorandum responding to the questions posed in your letter of July 25, 1983. The memorandum was drafted by Donald Stockdale, with assistance from Al Klevorick and me.

Stockdale asked me to remind you that the small number of research joint ventures formed in the United States and the lack of systematic data concerning them make it difficult to give definite or complete answers to your questions. Stockdale relied on information gleaned from his case studies, on the very modest literature on the subject, and on his theoretical analysis contained in our Second Year Progress Report.

Stockdale is planning to complete a draft of his case studies soon. I will forward a copy to you when it is available. A list of the joint ventures he is studying is appended to the enclosed memorandum. If you have any specific questions about these cases, or about the enclosed responses, please feel free to call Stockdale at work (212-483-9000) or at home (212-799-5587). Of course, Al Klevorick and I will also be available to discuss these issues with you.

I hope that the enclosed responses prove helpful.

Sincerely,

Richard C. Levin

Enclosure
cc: Alvin Klevorick
Donald Stockdale

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Responses to Questions Concerning Research Joint Ventures

1. Number of Research Joint Ventures

Unlike mergers, which U.S. firms must report under the Hart, Scott and Rodino Act, there is no requirement that U.S. firms report their participation in joint ventures. As a result, there exist no government data from which it is possible to determine the exact number of joint ventures, directed solely to R&D, which have been formed among U.S. manufacturing firms over the past twenty years. Nevertheless, various sources permit one to obtain a general idea of the extent of such joint venture activity.

First, the FTC published data on joint venture activity in its Annual Report on Mergers and Acquisitions for the period 1966-1979. It has since discontinued this practice. The data contain the four digit SIC number for the joint venture where available, the names of the participating firms, and the percentage ownership of the participating firms where available. Unfortunately, the data are not necessarily complete, do not state whether the venture was ever consummated, and fail to specify the purpose of the joint venture or whether R&D was to be performed. Professors Berg, Duncan and Friedman have examined the FTC's background files, but their published results do not separate out joint ventures directed solely to research (see Joint Venture Strategies and Corporate Innovation (1982) and sources cited therein). In telephone conversation, Professor Berg stated, however, that he believed very few such ventures exist.

Considerably more cooperative research appears to occur in industry associations than occurs in joint ventures consisting of a small number of participating firms. In the Role of Consortia in the National R&D Effort (1977), Professor Wolek sent questionnaires to almost 400 trade associations. Of the two hundred that replied, almost 50% claimed to perform at least some R&D. Professor Wolek found that such research as was performed tended to be more important in technologically unprogressive industries and that such research seldom resulted in significant technological advances.

Based on these studies, other secondary sources, and the interviews I have conducted, I would conclude that there has been a considerable amount of cooperative research conducted by industry associations (though it must constitute only a small percentage of total R&D expenditures), but that

relatively few cooperative R&D programs have been conducted by two or a few firms working together. With respect to this later category, three further observations should be made. First, where a small number of firms cooperate on R&D, they generally also cooperate in the manufacture of the products they develop. For example all of Control Data Corporation's joint ventures, with the exception of MCC, involve joint manufacturing. Similarly, Pratt & Whitney's jet engine joint ventures involve joint production. (See also case studies discussed in Berg, Duncan & Friedman (1982).) Second, vertical joint ventures, i.e., joint ventures between customers and suppliers, appear to be quite numerous. (See Berg, Duncan & Friedman (1982).) While such ventures generally involve joint production or joint development and production, the Inter-Industry Emissions Control Program and MCC suggest that customers and suppliers can also cooperate in performing R&D only. Finally, it appears that in at least a few industries (specifically, energy, semiconductors and computers, and aircraft frames and engines), there has been a recent increase in both R&D as well as R&D-and-manufacturing joint ventures.

2. Circumstances Fostering Cooperative R&D

A perceived common industry threat is frequently required to overcome a firm's usual reluctance to cooperate with competitors in conducting R&D. Among the more common and recurring threats are the following. First, cooperation may be prompted by a change in governmental regulations that significantly affects current industry practice, such as the government's ban on PCB's, which caused four capacitor manufacturers to cooperate in developing a substitute, or tightened government standards on auto-emissions, which helped prompt the formation of the Inter-Industry Emissions Control Program (see Commerce Department Technical Advisory Board, Institutional and Legal Constraints to Cooperative Energy Research and Development (1974)). Second, the competitive threat of a dominant domestic competitor or of foreign competitors may induce competitors to cooperate. For example, Control Data Corporation's numerous joint ventures were motivated in large part by the dominance of IBM, while the recent formation of Microelectronics and Computer Technology Corporation. (MCC) was prompted by recent Japanese successes with cooperative R&D. Third, the increased tendency on the part of foreign governments to impose domestic content requirements or to favor domestic firms has encouraged U.S. firms to enter joint development ventures with

foreign firms that involve cooperative R&D as well as joint production, (e.g., Pratt & Whitney's various joint development ventures).

Although a threat to the industry is often cited as providing the impetus to cooperate, the threat alone will not suffice to bring firms together; firms must, in addition, perceive some advantages inherent in cooperation. Based on secondary research and on the case study interviews conducted so far, the following appear to be the more important justifications for or advantages of cooperation in R&D.

First, cooperation permits sharing of the costs and risks of R&D. This factor appears especially important where the participating firms are relatively small and have limited research facilities (e.g., the four capacitor manufacturers search for a PCB substitute), where the research program is especially costly or risky (as in the development of a new jet engine), or where the technology is rapidly advancing so as to require large R&D expenditures to keep pace.

Second, firms appear more inclined to cooperate where the research is directed toward externalities and does not directly affect areas in which firms compete directly for profits. For example, Wolek found that much of the research carried on by industry associations involved environmental or health and safety issues. Similarly, the Chemical Industry Institute of Toxicology was formed to investigate the toxic effects of non-proprietary chemicals.

Third, the reduction in duplicative R&D is frequently mentioned as a justification for research joint ventures.

Fourth, a firm will often be willing to cooperate with firms in other industries or in other segments of the same industry, which are not considered competitors, in order to acquire knowledge or expertise that they themselves do not possess. Similarly, firms in a customer-supplier relationship may be willing to cooperate because of their complementary expertise and because they are not direct competitors.

Finally, U.S. firms often will cooperate with foreign firms to acquire technology or to penetrate foreign markets.

3. Factors Discouraging Cooperation

The following appear to be major obstacles to the formation of cooperative R&D ventures. First, a firm may fear that cooperation will adversely affect

its technological edge or competitive position. The firm may believe that it will have to share valuable proprietary information or,that working independently,it has a good chance to beat out competitors in obtaining valuable research results, and thus to obtain at least a temporary monopoly on the new technology. This latter factor, the possibility of a temporary monopoly, appears to constitute an especially strong deterrent to cooperation. Second, and related to the first factor, firms often fear that their potential partners will attempt to free-ride on their efforts.

Third, from the interviews conducted, the antitrust laws and uncertainty concerning them pose a significant deterrent to cooperative R&D. On the one hand, many firms, especially smaller ones, feel they cannot risk the possibility of a government suit. On the other hand, most firms appear unwilling to submit to the Antitrust Division's business review procedure because of the confidential information that is often demanded and because a positive review does not actually immunize them from subsequent suit, either government or private. In addition, several corporation executives interviewed stated their belief that the antitrust laws required them to open the joint venture to any interested firm and to make the results of the venture available to nonparticipating firms. Such a perception significantly diminishes the number of situations in which cooperation would appear attractive.

Finally, it is my perception that the larger firms in an industry tend to be particularly reluctant to cooperate in R&D, except in externality situations. The larger firms fear that smaller competitors will gain the most from the venture and that they are more likely to be subject to antitrust liability because of their greater size. Two examples of such reluctance on the part of large firms are General Electric's unwillingness to join with other capacitor manufacturers in developing a substitute for PCB and IBM's refusal to participate in MCC.

4. Industries Exhibiting Interest in Cooperative R&D

The following industries have indicated considerable interest in cooperative R&D. First, the energy industries have shown considerable support for cooperative ventures (e.g., the Electric Power Research Institute and the Gas Research Institute). Such interest appears attributable, at

least in part, to the oil crisis of the seventies and possible future shortages; to gradual government deregulation; to considerable government support, both financial and otherwise; and finally,to the fact that the participants generally are not direct competitors.

Second, the computer and semiconductor industries have shown considerable interest in cooperative R&D. Control Data Corporation was the pioneer in this area and remains the chief proponent of cooperation. According to Control Data executives involved in the ventures, Control Data first began these ventures, such as Computer Peripherals, Inc. and Magnetic Peripherals, Inc., as a way of improving its competitive position vis-a-vis IBM, the dominant force in the industry. At least initially, Control Data chose partners that occupied slightly different niches in the market. The perceived advantages of such joint ventures was that they enabled Control Data to share R&D costs and through joint production to expand output. This enabled Control Data Corporation to take advantage of economies of scale and to advance farther along the experience curve. According to these interviewees, numerous other computer manufacturers are now beginning to follow suit. In addition, thirteen companies in the computer and semiconductor industries recently formed Microelectronics and Computer Technology Corporation (MCC) to pursue more basic research and as a means of meeting Japanese cooperative R&D efforts. Finally, the newly-formed Semiconductor Research Corporation (SRC) has committed itself to the sponsorship of 40 research projects at 30 universities.

Third, the aircraft industry appears to be turning to joint development efforts. According to Pratt & Whitney executives, this is attributable to the following three factors: the increasing costs and risks of developing a prototype aircraft or engine, decreased world demand that allows only one manufacturer to produce a plane or engine in each segment of the commercial jet market, and the need for foreign partners to obtain access to foreign markets.

Fourth, the chemical industry has traditionally fostered a number of joint ventures. My impression is that these joint ventures usually involve production rather than R&D and consist of a larger company providing capital and production resources and expertise to a smaller one.

Finally, many industries, including those mentioned above, have found it mutually beneficial to cooperate on research directed to the amelioration

of problems caused by externalities. Examples of such cooperation include the chemical industry's formalition of the Chemical Industry Institute of Toxicology, the oil and automobile industry's creation of the Inter-Industry Emissions Control Program, and the extensive research on externality problems conducted by industry associations. (See Wolek (1977).)

5. Effectiveness of Cooperative R&D Ventures

Due to the lack of empirical data on research joint ventures and to the relatively small number of such ventures, it is difficult to evaluate their effectiveness.

Nevertheless, based on secondary research and on the case studies conducted, it would appear that such ventures have been relatively successful in meeting their goals. The qualification is important, however, for the goals appear to have been relatively modest. For example, Wolek, in his study of industrial consortia, concludes that the research is directed primarily to the improvement of existing technologies and to environmental or health problems, and that consortia seldom originate or develop new technologies. Similarly, in the case studies I have examined so far, the joint ventures have, for the most part, focused on applied research and on the development of existing technologies. They have not focused on basic research. Except for MCC, SRC, and the Chemical Industry Institute of Toxicology, I know of no cooperative R&D venture directed to basic research that has been formed in a technologically progressive industry.

The following speculation may help explain why so little basic research has been attempted. First, there are substantial difficulties associated with group decision-making, especially where considerable uncertainty exists. Second, many firms appear unwilling to invest in R&D where the payoff is distant and uncertain (due in part to problems of appropriability). Third, current antitrust policy has a deterrent effect on any form of cooperation.

Finally, and most importantly, despite its claims to the contrary, the Antitrust Guide does not provide clear guidelines for business decision makers. The uncertainties thus created constitute a significant disincentive to cooperation. For example, the Justice Department announced in December 1982 that it would not oppose the formation of MCC, but it

is presently studying each of the major research projects MCC plans to undertake. It is by no means clear that MCC will remain free of anti-trust challenge, and this cloud of uncertainty may delay and even discourage further plans for joint projects by MCC and by firms in other industries.

The following tentative recommendations are suggested as a way of making the guidelines for cooperative research clearer and of alleviating some of the problems discussed above. First, definite but more liberal guidelines based on market share should be established to notify business decisionmakers as to which RJVs are definitely lawful. For example, it would seem reasonable to consider RJV's lawful if the combined market shares of the participants is less than 25 or 30 percent of the market. Similarly, it would be reasonable to hold industry-wide joint ventures lawful if the eight-firm concentration ratio is less than 50 or 60 percent. It should be emphasized that under such a rule, protection from possible collusive behavior would remain, since the collateral restraints facilitating such collusion could be held to violate the Sherman Act, Section 1, even though the basic venture itself did not.

Finally, with regard to access to the joint venture or to its results, it is recommended that the cooperating firms have the presumptive right to choose their policy towards access. Mandatory licensing of the results of the venture would be required, however, where the RJV is directed towards externalities problems, where the combined market share of the participants exceeds some set figure, and where nonparticipants can prove that licensing is required to prevent a substantial lessening of competition. Nevertheless, even in such cases, the imposed royalties should provide for a reasonable return on the R&D investment.

CASE STUDIES

My empirical research consists of five case studies of research joint ventures. The case studies involved not only an analysis of the secondary literature but also in-depth interviews with executives and others involved in the ventures (usually the vice-president connected with the venture and occasionally the chief engineer). The case studies, which were selected so as to achieve a sampling of differing market structures, technologies and purposes of the venture, are as follows:

1. Control Data Corporation Joint Ventures. Control Data Corporation was the pioneer in joint ventures in the computer industry and remains their chief proponent. My study focuses on three of Control Data's cooperative efforts: namely, Computer Peripherals, Inc., Magnetic Peripherals, Inc., and Microelectronics and Computer Technology Corporation.

2. Pratt & Whitney Jet Engine Joint Venture. In 1975, Pratt & Whitney agreed with Rolls-Royce, Ltd., Motoren-Und Turbinen-Union GmbH, and Fiat Societa Per Azione to cooperate in developing, manufacturing and selling a new turbo-fan engine, currently designated the PW2037, for use on the next generation of mid-size commercial jets. Although Rolls-Royce withdrew in 1977, the three remaining participants continued development and are currently completing testing and accepting orders.

3. Joint Venture to Develop PCB Substitute. In 1976, four major capacitor manufacturing firms agreed to cooperate in developing and testing a new impregnant for A/C capacitors, to replace PCB which was banned under the Toxic Substances Control Act.

4. Chemical Industry Institute of Toxicology. Formed in 1974, CIIT, which currently has 35 members and a staff of 101, has as its purpose the acquisition, evaluation and dissemination of information concerning the potential toxic hazards of non-proprietary (bulk) chemicals.

5. Textile Research Institute. Formed in 1930, TRI currently has 60 corporate participants and a budget of $1.3 million. Research, both basic and applied, is among its major activities and is conducted in collaboration with Princeton University.

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Mr. HERZ. The antitrust anxiety is also confirmed by numerous conversations many of us have had with business executives and lawyers, including those who have been involved in putting together recent ventures. I think I will leave that for Mr. Lacey to go into.

At bottom, it probably arises from the inchoate discomfort of businessmen accustomed to constant worries and warnings about concerted activity when there is no indication that R&D joint ventures are in some way different from an antitrust perspective. Until the recent Justice Department "Antitrust Guide" that you referred to earlier, there was little official indication that an R&D joint venture would be considered different and more likely procompetitive than other forms of concerted activity.

We think, again, that what primarily is needed is simply a signal that there is a difference with R&D joint ventures. I would share, Congressman Lungren, your earlier expressed view that we do not have to go for all or nothing at this stage. There is clearly a movement in the attitude of the Antitrust Division, which I think even predates Mr. Baxter's arrival there, but certainly has been further accelerated by his being there. The more sophisticated practitioners of antitrust law are well aware of this already, and other lawyers will eventually come to know. If we can send out a clear symbol, I think we will go a long way to solve the problem.

We had a recent experience with that a few years ago when the Congress provided in the Bayh-Dole Act that universities and small businesses were to be entitled to patent rights on inventions developed in the course of federally supported research. At our agency and most others, that actually changed existing law and practice very little, maybe not at all. Yet, the change in perceptions that followed was really quite remarkable. Small businessmen who before this "knew" that the Government always took contractor patents suddenly became willing to consider business dealings with the Government or with Government researchers.

Here, too, the problem may be less the actual state of antitrust law and enforcement at this moment, than the perceptions of businessmen and lawyers. We think that the relatively modest changes in law could importantly alter those perceptions to the benefit of U.S. science and technology. Thank you.

[The prepared statement of Mr. Herz follows:]

Prepared Statement of Charles H. Herz

Mr. Chairman and Members of the Committee:

The interest of the National Science Foundation in the subject of today's hearing stems from our overriding concern with the health and vitality of the Nation's science and technology enterprise. We are inclined to believe that R & D joint ventures could play a larger role in that enterprise, and a potentially important one, in years to come. Concern about the antitrust consequences of such ventures currently seems a deterrent to their formation. We believe that relatively minor changes in antitrust law and perceptions could materially relieve those concerns.

What is most needed in our view is a clear signal of Government recognition that research and development joint ventures are likely to serve the interests of consumers and the public and unlikely to harm competition. Such a signal could ease the antitrust anxiety and so allow businessmen to consider R & D joint ventures on their economic merits.

We do not think, on the other hand, that legislation to remove the antitrust deterrent to R & D joint ventures need impose detailed requirements on the forms such ventures may assume or the activities they may undertake. Nor need we require Government involvement and approval before R & D joint ventures can proceed.

We would like in passing to draw the attention of the Committee to some other improvements in the antitrust and intellectual property laws that could benefit the U.S. science

and technology enterprise.

One set of improvements would ensure that licensing practices are not condemned as anticompetitive or a "misuse" of intellectual property protections without economic evidence and analysis. Such practices may often on balance actually stimulate competition and benefit consumers. Their condemnation in current law limits the value of proprietary rights in intellectual property and so weakens the incentive to create or exploit it.

Another improvement would close the loophole that allows a supplier to circumvent a U.S. patent on a commercial or industrial process by using the patented process in another country to make products that are then imported into the United States royalty-free.

Since the focus of your hearing today is on the need for change in the antitrust law regarding R & D joint ventures, I will not dwell further on these proposals regarding licensing and process patents. We do hope, though, that the latter will get equally close and speedy attention in the Congress.

Potential Underinvestment in R & D

R & D joint ventures, like intellectual property protections, are among mechanisms available to protect against underinvestment in commercially relevant research and development. At a time of greatly heightened international competition we can ill afford such underinvestment. Our industries must invest sufficiently in R & D (and must turn it to strategically effective use) if they are to compete successfully with their competitors in

Japan, Europe, and elsewhere. No longer can U.S. policy afford to be concerned solely with competition within a U.S. industry. Competition between that industry and the industries of other countries may be equally important to us.

The danger that we will underinvest in commercially relevant R & D is real. It stems from two interrelated problems. One is that high cost, high risk projects worthwhile for an entire industry or for the economy as a whole may be beyond the risk-bearing or self-insuring capacity of individual companies. The other is that an individual company may be unable to appropriate to itself a sufficient share of the fruits from its R & D investments.

When a company makes a capital investment of another sort and creates a new plant or production line, it owns and controls that plant and production line itself and can profit accordingly. When it invests in R & D, however, it creates new knowledge or techniques that can easily slip away, becoming known to others by publication, by reverse engineering, or however. Other companies, including competitors, may then become "free ride" beneficiaries of the company's R & D investment.

This is less likely to happen, of course, if the R & D produces only an incremental improvement in a product or process more or less unique to the particular company. But it is more likely to happen in the more important case where the new knowledge or technique is more fundamental and applicable generically to more widely used technology.

Indeed, the knowledge or technique developed may turn out to be highly significant, but in someone else's business or in markets where the investing company has no position. The company may at best be able to sell or license the technology it has developed to another company better situated. In this way too the performance of R & D may be riskier for the individual company than it may be for the industry or the economy as a whole.

Unless something can be done to secure more of the benefits to the performing company, the incentive of the individual company to perform R & D, particularly of the more risky and fundamental kinds, will be too low. The investment in such research by individual companies will not correspond with the potential benefits to an industry or to the economy as a whole.

An individual company may try to appropriate more of the benefits from its R & D by keeping the results a trade secret. Trying to maintain secrecy, though, requires considerable expenditures on security, deprives the company's researchers of professional recognition that goes with publication (which is particularly important for fundamental or basic researchers), and may not be successful for long.

From the point of view of the industry or economy as a whole, moreover, secrecy has further drawbacks. It risks uneconomic duplication of scientific or engineering effort. Several companies may attack the same problem in the same or a very similar way when only one or two need do so to achieve a particular scientific or technical result. Secrecy cuts off

a company's researchers from cross-fertilization with researchers working on the same or similar problems in other companies. Such cross-fertilization often could result in speedier or more profound results. And secrecy obviously hampers dissemination and use of the new technology that is kept secret.

The intellectual property protections afforded by our patent and copyright laws provide a partial solution to the dilemma, allowing companies to disclose and license without losing proprietary rights. Even if strengthened as I have already suggested they should be, however, intellectual property protections represent only a partial solution to the problem of underinvestment in R & D by individual corporations, particularly at the more fundamental or "basic" end of the science and technology spectrum. By no means all the fruits of R & D are fully covered. Indeed, the most basic scientific discoveries, likely the most important, cannot be patented at all.

Role of R & D Joint Ventures

Federal support of fundamental science and engineering research in Government and university laboratories can be seen partly as another response to the likely underinvestment in research and development caused by limitations on the risk-bearing capacity of individual companies and by inappropriability of research results. Supporting that kind of research is our primary business at the NSF.

This sort of Government-supported research is driven to a greater extent than corporate R & D by the internal development and growth of scientific and engineering knowledge. It has been enormously fruitful for the U.S., and never more so than recently. In development of industrial technology, however, it does well primarily as a supplier of generically applicable knowledge and techniques. It lacks, in particular, the close coupling with production and marketing realities and the spur of competition that are the strengths of the corporate R & D lab.

Between the generically applicable basic and applied research which the Government supports effectively and the more specifically appropriable R & D for which individual companies ordinarily can justify the costs and risks lies a middle ground -- some would say a gap -- in which underinvestment may remain a problem.

This "middle ground" cannot be simply characterized. Its locus varies with the nature of the science and technology in question and from industry to industry. It may be typified, however, by the frontier science or technology that promises broad commercial application and value in five, ten, or fifteen years, but still poses great risk for an individual company. R & D joint ventures are one of several mechanisms by which we can help ensure that the U.S. invests adequately in this middle ground.

Bell Laboratories and a few other corporate research laboratories can and do move into and even across the "middle

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ground". They even do some basic research not easily distinguished from research the NSF supports at universities. But this has been possible only for very large companies with sufficient market shares to anticipate appropriating substantial shares of the benefits from such research. It is no accident, for example, that Bell Labs is part of a large company that has long held a near-monopoly position in its industry.

The middle ground is also entered by small companies spun off from university research, as in Silicon Valley of California and around Route 128 in New England. Industry association R & D activities and industry-wide R & D consortia like the Electric Power Research Institute also contribute.

Industry-university collaboration -- from consulting arrangements with individual professors to joint research projects to major industry-supported research centers on campus -- have lately been mushrooming with active support from the National Science Foundation. Such collaboration too may be regarded as a means of filling the middle ground.

The recent increased interest in R & D joint ventures that has given rise to suggestions for a less restrictive and threatening antitrust regime is another part of the same picture. It derives from the same increased awareness that in an era of accelerating technology development, increasingly complex and costly R & D, and heightened international competition, the United States and specific U.S. industries need to be concerned about research and development that a typical corporation cannot take on alone.

In this context the potential advantages of an R & D joint venture seem substantial. By spreading costs and risks a joint venture may hold the individual company's share of costs and risks within its capacity. It may also better match the individual company's share of the costs and risks with the share of the benefits it can hope to receive. A joint venture may thus allow more risky, fundamental, and somewhat longer-term R & D than any individual company would support on its own. Nonetheless the work could stay in the private sector, where it can remain in contact with production and marketing realities.

An R & D joint venture may also eliminate unnecessary and unwitting duplication of work by two or more R & D labs working in the same or similar areas. It may allow researchers to communicate more closely with one another, speeding their work and allowing connections to be seen and conclusions drawn that otherwise might be missed.

Particularly significant in the antitrust context, an R & D joint venture may allow for more effective competition. It may enable the smaller fish in an industry to compete effectively in R & D with larger and more dominant competitors. Apparently, for example, Control Data has made R & D joint ventures a key part of its strategy for staying competitive with IBM, and one expression of this strategy is the Microelectronics and Computer Technology Corporation (MCC), the highly publicized joint venture of which Control Data was the original chamipion. IBM is not a member.

Similarly, R & D joint ventures may enable U.S. industry to compete more successfully with foreign industry. This too seems to be a major motive for formation of the MCC and of the Semiconductor Research Cooperative (SRC), another microelectronics industry consortium that primarily supports university based R & D. Other nations, notably Japan, have actively encouraged joint research and development; U.S. companies may need similarly to work together in the new era of international competition.

Antitrust Reform to Encourage Research Joint Ventures

Despite these advantages, R & D joint ventures among U.S. companies have been sparse, at least until very recently. In one three-year period (1977-79), a study based on published reports of joint ventures identified only 21 joint R & D ventures with no production or marketing components. Some others may have been unpublicized, and the numbers have likely increased in the last two or three years. Even so, this is quite a small number.

Why so few? There are purely economic reasons of considerable and possibly overriding importance. Firms may fear to surrender a competitive edge by sharing proprietary information or by foregoing the possibility that they could achieve breakthroughs in competitively important areas on their own. Firms that are already strong in R & D seem particularly concerned that an R & D joint venture will give weaker competitors a free ride.

Clearly, however, antitrust fears are also a significant deterrent. That is the preliminary finding of a Yale group's current research on R & D joint ventures. I have with me a

copy of a summary report they prepared for us and would be glad to submit it for the record. Antitrust anxiety is confirmed by numerous conversations with business executives and lawyers, including those who have been involved in putting together recent ventures. Paradoxically, antitrust anxiety seems greater in small to medium sized firms, which presumably have less to fear from the antitrust laws, than in larger firms with greater market power, but also greater antitrust sophistication.

The level of antitrust anxiety seems surprising considering the record, which reveals little or no antitrust action against pure R & D joint ventures, either by the Government or by private plaintiffs. That may in part simply reflect the small number of such joint ventures that have until recently been formed. In part, it reflects the special threat of triple damages and the incentive they give to lawsuits that can be costly to defend even if they are won. And in part it reflects the discomfort of businessmen accustomed to constant warnings and worries about concerted activity when counsel cannot remove all uncertainty that an R & D joint venture might be in the same legally dangerous category. Indeed, until the relatively recent 1980 issuance of the Justice Department's Antitrust Guide Concerning Research Joint Ventures, there was little official indication that an R & D joint venture would be considered different and more likely procompetitive than other forms of concerted activity.

Some of the current legislative proposals would try to reduce antitrust uncertainty by providing a safe haven if a joint venture meets specific requirements concerning entry, structure, licensing and the like. Others would try to accomplish the same thing through precertification by the Antitrust Division. Though the objective is undeniably attractive, each of these mechanisms has drawbacks that lead us on balance to recommend against them.

The specific requirements of the "safe haven" formats would not reduce all uncertainty. On the contrary, they would create new uncertainties about the content of new and undefined terms not yet tested in the courts. More seriously, they would tend to force R & D joint ventures into rigid molds, perhaps even exacerbating antitrust anxiety about ventures that do not meet one or more of the requirements. This may have the effect of excluding other forms of joint venture that can be equally desirable.

We question, for example, whether all joint ventures should have to be open to all comers and whether the venture should be required to license to nonparticipants who have not shared the costs and risks.

Firms will undertake R&D, whether individually or collaboratively, only if they judge it to be in their long-term interest as likely to result in some competitive advantage. Competitive advantage, however, requires some measure of exclusivity in the technology that is developed. If marketable products or processes result, it also means the ability to

decide whether or not to license competitors and at what rate. If the venture does decide to license the product that emerges, it ought to be allowed to set a fee that reflects not only the costs associated with that particular product or process, but also the costs of other R&D projects that didn't come to market. Otherwise, the licensee gets a "free ride" -- it benefits from the successes of the venture, but avoids the costs and risks of failure.

We also share the concern of the antitrust authorities that the "safe haven" could unexpectedly put truly anticompetitive activities beyond the reach of antitrust enforcement. The terms of the antitrust laws, tested by time, are general and correspondingly vague for the reason that competitive or anticompetitive effect is not easily judged apart from the facts and circumstances of particular transactions.

Precertification by the Antitrust Division, besides putting Justice into an uncomfortable and arguably inappropriate regulatory role, carries a different sort of risk. Particularly considering that Justice would be asked to take a position in advance of any actual activity by the joint venture, caution would surely be the byword. Justice attorneys might under those circumstances require detailed information on how the joint venture will proceed, notwithstanding that research is inherently unpredictable, and might condition any certificate on detailed assurances. The venturers could end up tailoring the venture to satisfy the new Federal regulators and troubled by new uncertainties about whether all the conditions and assurances are being satisfied.

In short, we are inclined to worry that in this area, as in others, certainty either will prove largely elusive or will be bought at cost of rigidity and bureaucracy. Either detailed legal requirements or Antitrust Division certification is likely to end with lawyers supplanting scientists and engineers in designing R & D ventures -- as good a way as I know to discourage such ventures. Businessmen do live with some uncertainty under the antitrust laws and other laws every day. What really seems needed here is just a clear signal that R & D joint ventures are relatively favored under the law -- that such joint ventures are seen as more likely to be procompetitive than other forms of concerted action by competitors. S. 1841 would accomplish this by denying any possibility that such a venture would be considered a per se violation and by eliminating triple damages for any violation. These changes would carry none of the risks and rigidities entailed in "safe harbor" requirements or Justice Department precertification, but they would suffice to send the necessary signal to lawyers and businessmen alike.

In our experience the symbolic effect of such a move could be even more important than the actual legal changes. A few years ago Congress provided in the Bayh-Dole Act that universities and small businesses were to be entitled to patent rights on inventions developed in the course of Federally supported research. At our Agency and most others this changed existing law and practice very little, if at all. Yet the change in perceptions that followed was remarkable. Businessmen who

"knew" that the Government always took contractor patents suddenly became willing to consider business dealings with the Government and with university researchers supported by the Government that before they would have thought out of the question.

Here too the problem today may be less the actual state of antitrust law and enforcement than the perceptions of businessmen, lawyers and judges. Relatively modest changes in the law could importantly alter those perceptions to the benefit of U.S. science and technology.

Representative LUNGREN. Next we will hear from Mr. John Lacey, executive vice president of Control Data Corp. Again, Mr. Lacey, your entire prepared statement will appear in the record, and you may proceed as you wish.

STATEMENT OF JOHN W. LACEY, EXECUTIVE VICE PRESIDENT, CONTROL DATA CORP.

Mr. LACEY. Thank you, Congressman.

I am grateful to you and your colleagues on this committee for the opportunity to be here today and to participate in your hearings.

High-technology industries in the United States are a proven vehicle for job creation, and that fact alone is sufficient reason to place high national priority on assuring there is national competitiveness and growth.

A wide range of potential options for enhancing our international competitiveness exists, but I believe that the most crucial single factor for success is cooperative research and advanced technology development.

Our country's once strong international position in technology has been steadily eroding while other nations have devised way to accelerate their development and application of advanced technology.

Our foreign competitors have greatly expanded R&D spending while they have minimized needless research and development duplication. They have dramatically increased their supply of trained scientific and technical personnel, and they have reduced the cost of capital to their key industries.

In the last few years, the U.S. position in microelectronics has gone from one of unquestioned and seemingly unassailable leadership to one of considerable vulnerability. The story of the 64,000-bit random access memory chip, the much discussed possibility that we may be dependent on Japan for super computers by the end of this decade, and the Japanese fifth-generation project to become the world leaders in computing by the 1990's all support that contention.

As these developments show, the greatest progress in advancing and exploiting technology has been made by Japan in targeted industries. The Japanese targeting strategy is well executed and founded on government-promoted cooperation at the base technology level. It is an ominous threat, that has serious implications for virtually all modern industries, for our economic well-being, and for our national security.

An adequate response will require many and varied actions. However, by far the greatest and most rapid progress can be achieved within U.S. industry by increasing our efficiency in developing and applying technology.

The easy and relatively inexpensive technology advances in microelectronics and computers are behind us. Each successive advance requires a greater commitment of capital and intellectual resources than did the previous one. As a result, smaller enterprises, left to go it alone, have been forced more and more to pursue too few technology alternatives—and that brings with it the high risk of falling behind and becoming unable to compete in the longer term.

The two factors of resource scarcity and heightened international competition are eroding the innovative capacity of U.S. advanced electronics industries. If we are to preserve an economically healthy number of competitors, we simply must combine technology resources in time to meet and match the highly organized oversea competition.

As has been stated earlier, Control Data is a member of Microelectronics and Computer Technology Corp.—MCC for short—and along with a dozen or so other companies was very active in its formation. We were driven to do so by the factors I have just described, but its specific structure was influenced by additional considerations, and I believe that they are important ones.

We felt the need to concentrate on those areas of advanced technology in which individual firms simply cannot effectively operate due to unacceptably high costs, high risks, or shortages of critical skills.

We wanted to provide member firms with the incentive to invest up front in MCC technology programs, but at the same time, we wanted the technology to foster competition by making it available to other companies on reasonable terms. And that is especially important, in our view, to small companies which are typically very efficient in converting base technologies into innovative products and services.

We wanted to create an entity that could be effective even if funded solely by the private sector. This approach is in line with present national policy to reduce the rate of increased Federal spending.

But above all, we wanted to leave plenty of room for each shareholder or licensee of MCC to add value to the MCC technology and compete in markets of its own choosing with products and services of its own design.

In my remaining few minutes, I would like to comment on why legislation is necessary to encourage cooperation and highlight a couple of important attributes, discussed more fully in my prepared statement that such legislation should include.

There are, of course, several impediments to research and development cooperation, some of which are ingrained in the U.S. business culture, and will only be overcome through visionary private sector initiatives.

But one barrier that rears its head every time this subject is broached is uniquely in the province of Congress: The fear of inadvertently violating U.S. antitrust laws and the threat of treble damages.

There has been considerable discussion about perceptions versus reality as to existence of an antitrust impediment to R&D cooperation of this kind. Based on my MCC experience, I assure you that there is such a perception, and the critical reality is that such cooperation has been, is, and will continue to be deterred unless some action is taken to clarify the antitrust laws as applied to such activity.

Thus, both the historical absence of significant research and development cooperation, and the MCC experience itself, exemplify the overdeterrence of an ambiguous antitrust environment. In order to bring about widespread research and development cooperation, we need to change the tenor of current laws—from laws that sometimes permit it—to legislation that encourages this type of joint cooperation.

There is general agreement among companies and industries with which Control Data is associated that the most equitable and effective legislative approach would include four principles, major parts of which are contained in many bills that are now before the Congress.

First, immunity for R&D ventures that meet statutory standards; second, immunity on the basis of disclosure; third, a single damage safety net for R&D joint ventures; and finally, attorneys' fees for either prevailing party to litigation—defendants as well as plaintiffs.

I cannot cover all of these in the few minutes I have left, but I will devote the majority of my remaining time to the first of them because that is the only approach, in our view, which addresses the root causes of the current problem, and the basic public policy objective for widespread use of the technology which results from such cooperation.

The idea of immunity for R&D ventures meeting certain prescribed standards is a key one. The most important need in this whole matter, it seems to me, is to encourage cooperative research and advanced technology development and its widespread dissemination, without dismantling the basic body of antitrust law which has served this country so well.

The approach of having legislatively prescribed standards does precisely that. Such an approach does not change our antitrust laws; rather, it clarifies or specifies in advance, if you will, the rule of reason as it relates to cooperative research and development. Under this approach, Congress would prescribe statutory criteria for lawfully organizing and conducting joint R&D ventures which, if met, would shield a venture from antitrust attack. This would remove the existing uncertainty among businessmen because, unlike other proposals, companies would know in advance how to organize and conduct their R&D joint ventures.

We prefer this approach to one which would require certification by or disclosure to the Justice Department, since neither of those approaches serve to clarify the law. Research activities are by definition constantly in flux. One can readily anticipate under certification or disclosure provisions, weekly or monthly filing by ventures summarizing their upcoming activities that have been caused to change as a result of research that they have undertaken. The Justice Department would then be converted from an enforcement agency into a regulator. Further, such required disclosure could in fact inhibit the formation of needed ventures due to proprietary concerns on the part of the ventures.

The disclosure concept could, however, serve a useful role as an additional or optional track to immunity. It would afford an opportunity for ventures that were either unsure as to whether they fit the legislatively prescribed standards or ventures that elect not to meet them, even though they are procompetitive.

This approach, by the way, is included in H.R. 4043 as it was reported out of the Subcommittee on Science, Research, and Technology of the House Committee on Science and Technology last week.

Incidentally, Congressman, I might point out that my reference to H.R. 4043 here today and in my prepared statement are to the subcommittee's version of last week. I understand the full committee is now marking up the bill and some change is in the process of occurring.

But back to my main point. Control Data's primary criticism of approaches which do not include the adoption of specific legislatively prescribed, objective, standards is that they do not encourage the widespread use of technology, which from the standpoint of international competitiveness and job creation are at least as important as the creation of the technology in the first place.

I think I should leave my remarks at that point, Congressman Lungren, and defer to you.

[The prepared statement of Mr. Lacey follows:]

Prepared Statement of John W. Lacey

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

MY NAME IS JOHN W. LACEY, EXECUTIVE VICE PRESIDENT OF CONTROL DATA CORPORATION, WHICH IS HEADQUARTERED IN MINNEAPOLIS, MINNESOTA. BUSINESSES, INDUSTRIES, EDUCATION INSTITUTIONS AND GOVERNMENTS THROUGHOUT THE WORLD USE CONTROL DATA COMPUTER SERVICES AND SYSTEMS, PERIPHERAL PRODUCTS AND FINANCIAL SERVICES.

I WISH TO THANK YOU, MR. CHAIRMAN, FOR THE OPPORTUNITY TO BE HERE TODAY, AND TO COMMEND YOU FOR YOUR INTEREST IN LEGISLATION TO ENCOURAGE COOPERATIVE RESEARCH AND ADVANCE TECHNOLOGY DEVELOPMENT THROUGH CLARIFICATION OF THE UNCERTAINTIES IN THE INTERPRETATION AND APPLICATION OF U.S. ANTITRUST LAWS. THE UNITED STATES TODAY FACES SEVERE CHALLENGES--TO ITS TECHNOLOGICAL LEADERSHIP, TO ITS INTERNATIONAL COMPETITIVE POSITION AND, ULTIMATELY, TO THE SECURITY AND ECONOMIC WELL-BEING OF ITS CITIZENS. MEETING THESE CHALLENGES WILL

REQUIRE MANY ACTIONS. HOWEVER, I BELIEVE THAT THE SINGLE MOST EFFECTIVE ONE IS TO VASTLY INCREASE TECHNOLOGICAL COOPERATION AMONG U.S. COMPANIES--AND TO THEREBY STIMULATE BOTH THE CREATION AND USE OF TECHNOLOGICAL INNOVATIONS NECESSARY FOR SURVIVAL IN TODAY'S WORLDWIDE ECONOMIC ENVIRONMENT.
IN THE FEW MINUTES AVAILABLE TO ME THIS MORNING, I WOULD LIKE TO COMMENT ON THE CRITICAL NEED FOR SUCH COOPERATION, WHY LEGISLATION IS NECESSARY TO ACHIEVE IT, AND, FINALLY, THE APPROACH SUCH LEGISLATION SHOULD TAKE.

1. THE NEED-- REQUIRED BY A CHANGED ENVIRONMENT.

OUR COUNTRY'S ONCE STRONG INTERNATIONAL POSITION IN TECHNOLOGY HAS BEEN STEADILY ERODING BECAUSE OTHER NATIONS HAVE TAKEN A NUMBER OF STEPS TO ACCELERATE THEIR DEVELOPMENT AND APPLICATION OF ADVANCED TECHNOLOGY.

OUR FOREIGN COMPETITORS HAVE GREATLY EXPANDED THEIR EXPENDITURES FOR RESEARCH AND ADVANCED TECHNOLOGY DEVELOPMENT AND THEY HAVE MINIMIZED NEEDLESS DUPLICATION IN DOING SO. THEY HAVE DRAMATICALLY INCREASED THEIR SUPPLY OF TRAINED TECHNOLOGISTS AND THEY HAVE REDUCED THE COST OF CAPITAL TO THEIR KEY INDUSTRIES.

IN JUST A FEW SHORT YEARS, THE U.S. POSITION IN MICROELECTRONICS HAS GONE FROM ONE OF UNQUESTIONED AND SEEMINGLY UNASSAILABLE LEADERSHIP TO ONE OF CONSIDERABLE VULNERABILITY. WE ARE NOW IN SECOND PLACE IN WORLDWIDE SHIPMENTS OF A PARTICULAR ADVANCED MICROELECTRONIC COMPONENT--THE 64 THOUSAND-BIT RANDOM ACCESS MEMORY CHIP--AND A REPORT BY A GOVERNMENT RESEARCH LABORATORY RAISES THE POSSIBILITY THAT THE U.S. MAY BE DEPENDENT ON JAPAN FOR SUPER COMPUTERS BY THE END OF THIS DECADE. MOREOVER, ALMOST TWO YEARS AGO JAPAN SPONSORED AN INTERNATIONAL CONFERENCE TO ANNOUNCE ITS INTENTION TO BECOME THE WORLD LEADER IN COMPUTING BY 1990.

AS THESE DEVELOPMENTS SHOW, JAPAN HAS MADE GREAT PROGRESS IN ADVANCING AND EXPLOITING TECHNOLOGY IN TARGETED INDUSTRIES. THE JAPANESE GOVERNMENT HAS PROMOTED COOPERATION AMONG INDUSTRY MEMBERS AT THE BASE TECHNOLOGY LEVEL AS A KEY STRATEGY FOR SUCCESS. THIS STRATEGY, PARTICULARLY AS IMPLEMENTED IN THE AREAS OF MICROELECTRONICS AND COMPUTERS, POSES AN OMINOUS THREAT THAT HAS SERIOUS IMPLICATIONS FOR VIRTUALLY ALL MODERN INDUSTRIES IN THE U.S., AND FOR OUR NATIONAL SECURITY AS WELL. THIS THREAT IS ACCENTUATED BY THE PERVASIVE AND RAPIDLY GROWING APPLICATION WITHIN ALL INDUSTRIES OF THESE BASE TECHNOLOGIES.

TO MEET THIS THREAT, WE MUST INCREASE OUR EFFICIENCY IN DEVELOPING AND APPLYING TECHNOLOGY. RESEARCH IS INHERENTLY BOTH COSTLY AND RISKY. GIVEN THE SCARCITY OF AVAILABLE RESOURCES--BOTH HUMAN AND FINANCIAL--ACHIEVEMENT OF EFFICIENCIES BY DEFINITION WILL REQUIRE A VAST INCREASE IN TECHNOLOGICAL COOPERATION. THE U.S. SUFFERS FROM AN INCREDIBLY WASTEFUL DUPLICATION OF RESEARCH AND DEVELOPMENT EFFORTS. FOR EVERY CORPORATION TO REDISCOVER WHAT OTHERS HAVE ALREADY LEARNED REPRESENTS WASTE--NOT ONLY TO EACH COMPANY--BUT ALSO TO SOCIETY. THIS IS ESPECIALLY VALID IN LIGHT OF OUR CRITICAL SHORTAGE OF COMPETENT SCIENTIFIC AND ENGINEERING TALENT.

FINALLY, THE PROBLEM IS EXACERBATED BY THE FACT THAT AT A TIME WHEN WE ARE FORCED TO RESPOND TO GOVERNMENT-COORDINATED CHALLENGES FROM ABROAD WITH ALREADY LIMITED RESOURCES, THE DEMANDS ON THOSE RESOURCES ARE EXPLODING--BOTH IN TERMS OF THE POTENTIAL TECHNOLOGICAL OPPORTUNITIES TO PURSUE AND THE ABSOLUTE COSTS OF PURSUING ANY GIVEN OPPORTUNITY. SOME PROJECTS ARE EVEN TOO LARGE FOR AMERICA'S LARGEST COMPANIES; AND MANY MORE REQUIRE RESOURCES FAR IN EXCESS OF WHAT MEDIUM-SIZE OR EVEN LARGE FIRMS ARE ABLE--OR, OF EQUAL IMPORTANCE, ARE WILLING, IN LIGHT OF OTHER DEMANDS--TO COMMIT. UNDER SUCH CIRCUMSTANCES, INCREASED COOPERATION IS NO LONGER AN OPTION IF THE U.S. IS TO REMAIN COMPETITIVE; IT IS A REQUIREMENT.

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2. THE LEGAL IMPEDIMENT TO COOPERATION--ANTITRUST.

THERE ARE, OF COURSE, SEVERAL IMPEDIMENTS TO COOPERATION, SOME OF WHICH ARE INGRAINED IN THE U.S. BUSINESS CULTURE AND WILL ONLY BE OVERCOME THROUGH VISIONARY PRIVATE-SECTOR INITIATIVES. BUT ONE BARRIER THAT REARS ITS HEAD EVERY TIME THIS SUBJECT IS BROACHED IS UNIQUELY IN THE PROVINCE OF CONGRESS, MR. CHAIRMAN: THE FEAR OF INADVERTENTLY VIOLATING U.S. ANTITRUST LAWS AND THE THREAT OF TREBLE DAMAGES.

COOPERATIVE R&D, FROM AN ANTITRUST STANDPOINT, TYPICALLY FALLS UNDER WHAT THE LAWYERS CALL "THE RULE OF REASON"--WHERE THE QUESTION OF LEGALITY OR ILLEGALITY DEPENDS ON THE INTERRELATIONSHIP OF A VARIETY OF COMPETITIVE CIRCUMSTANCES. IN THIS RESPECT, IT IS UNLIKE ACTIVITIES SUCH AS PRICE-FIXING WHICH, ARE, AND SHOULD CONTINUE TO BE, PER SE ILLEGAL.

IN COOPERATIVE R&D, LEGALITY OFTEN CANNOT BE CONCLUSIVELY ESTABLISHED AT THE INCEPTION OF THE VENTURE, SINCE ONE'S VIEW OF THE "CIRCUMSTANCES" SURROUNDING A VENTURE WILL VARY ACCORDING TO THE WEIGHT GIVEN TO EACH OF ITS ELEMENTS. MOREOVER, THE VIEW INEVITABLY REFLECTS THE TIMING AND THE PREDILECTIONS

OF THE ANALYSTS. THUS BUSINESS LEADERS RECEIVE LEGAL ADVICE FRAUGHT WITH UNCERTAINTY--WHERE THE ULTIMATE LEGALITY OR ILLEGALITY OF OUR ACTIONS, WE ARE TOLD, CAN ONLY BE CONCLUSIVELY DETERMINED BY LITIGATION--A COMPLEX, EXPENSIVE AND TOTALLY NON-PRODUCTIVE EXERCISE.

WE THUS HAVE AN ENVIRONMENT WHICH DEMANDS INCREASED COOPERATION, BUT WHERE MANY COMPANIES INTERESTED IN COOPERATION ARE DETERRED BY CONFUSION AND UNCERTAINTY--WHERE A COMPANY'S GO/NO-GO DECISION TO JOIN A COOPERATIVE R&D VENTURE IS BASED ON THE HOPE THAT THE JUDGMENT OF ITS LAWYER WILL ULTIMATELY BE SUSTAINED BY A MAJORITY OF THE LEGAL AND ECONOMIC THEORISTS WHO WILL, YEARS LATER, EXAMINE THE RESULTS WITH THE BENEFIT OF 20/20 HINDSIGHT: WHERE A WRONG DECISION COULD THREATEN THE SURVIVAL OF THE COMPANY AND WHERE EVEN A RIGHT DECISION STILL EXPOSES THE COMPANY TO THE POSSIBLE EXPENDITURE OF WEEKS OR MONTHS OF EXECUTIVE TIME AND THOUSANDS IF NOT MILLIONS OF DOLLARS IN DEFENSE COSTS.

THE CONFUSION UNDER CURRENT LAW IS GREATLY COMPOUNDED BY THE FACT THAT, EVEN IF THE JUSTICE DEPARTMENT SHOULD AGREE THAT AN R&D VENTURE IS PROCOMPETITIVE , THAT DETERMINATION DOES NOT BIND FUTURE ADMINISTRATIONS. IN ANY EVENT, THE FINAL WORD ON THE SUBJECT CAN ONLY BE ISSUED BY A COURT, OFTEN AT THE URGING OF A PRIVATE, TREBLE-DAMAGE LITIGANT WHOSE INTEREST MAY HAVE LITTLE OR NOTHING TO DO WITH THE NATIONAL INTEREST.

3. MCC--A "LEARNING EXPERIENCE."

MY FAMILIARITY WITH THIS TOPIC STEMS, IN CONSIDERABLE PART, FROM RECENT EXPERIENCE IN THE FORMATION OF A RESEARCH AND DEVELOPMENT JOINT VENTURE IN THE AREA OF MICROELECTRONICS AND COMPUTER SCIENCE. THIS VENTURE, KNOWN AS MICROELECTRONICS AND COMPUTER TECHNOLOGY CORPORATION (MCC), IS A COOPERATIVE EFFORT BY AMERICAN COMPUTER AND SEMICONDUCTOR COMPANIES TO DEVELOP A BROAD BASE OF FUNDAMENTAL TECHNOLOGIES FOR USE BY MEMBERS WHO WILL, IN TURN, EACH ADD THEIR OWN VALUE TO PRODUCE PRODUCTS AND SERVICES OF INDIVIDUAL CONCEPTION AND DESIGN TO SERVE A WIDE VARIETY OF NEEDS. PARTICIPATING COMPANIES SO FAR INCLUDE ADVANCED MICRO DEVICES, ALLIED CORPORATION, CONTROL DATA, DIGITAL EQUIPMENT CORPORATION, HARRIS, HONEYWELL, MARTIN-MARIETTA, MOSTEK, MOTOROLA, NATIONAL SEMICONDUCTOR, NCR, RCA AND SPERRY.

RESEARCH CONSORTIA SUCH AS MCC WILL PROMOTE INCREASED TECHNOLOGICAL INNOVATION; IMPROVE PRODUCTIVITY BY ENABLING PARTICIPANTS TO TAKE ADVANTAGE OF ECONOMIES OF SCALE; AND FOSTER COMPETITION BY ACCELERATING THE TRANSFER OF TECHNOLOGY THROUGHOUT THE ECONOMY AND PARTICULARLY TO SMALL BUSINESS. MCC

AND SIMILAR VENTURES IN OTHER INDUSTRIES CAN PROVIDE A MEANINGFUL PRIVATE-SECTOR RESPONSE TO THE DUAL CHALLENGES OF RESOURCE SHORTAGES AND FOREIGN GOVERNMENT-LED INDUSTRIAL POLICIES.

OUR OWN EXPERIENCE WITH THE FORMATION OF MCC UNDERSCORES THE URGENT NEED FOR CONGRESS TO ACT TO CLEAR AWAY THE UNCERTAINTIES IN THE INTERPRETATION AND APPLICATION OF ANTITRUST LAWS AS THEY RELATE TO R&D JOINT VENTURES. DESPITE OBVIOUS RESOURCE SHORTAGES IN THE FACE OF INCREASED DEMANDS ON THOSE RESOURCES, AND DESPITE THE URGENCY DEMANDED BY THE WORLD COMPETITIVE SITUATION, IT TOOK OVER 18 MONTHS FOR MCC TO PROCEED FROM AN IDEA TO A CORPORATE SHELL. DURING THAT PERIOD, MR. NORRIS, CONTROL DATA'S CHAIRMAN, MR. PRICE, OUR PRESIDENT, AND I DEVOTED MANY HOURS TRYING TO OVERCOME THE SKEPTICISM AND RETICENCE OF EXECUTIVES LESS FAMILIAR WITH A COOPERATIVE APPROACH TO PROBLEMS. WE REPEATEDLY ENCOUNTERED THE SO-CALLED "BARRIER" OF U.S. ANTITRUST LAWS,--A CONVICTION BY MANY EXECUTIVES THAT IRRESPECTIVE OF MCC'S LEGALITY, SUCH COOPERATION WAS INEVITABLY AN INVITATION TO BECOME A DEFENDANT IN AT LEAST ONE HORRENDOUSLY EXPENSIVE AND TIME-CONSUMING LAW SUIT. I AM AWARE THAT THERE HAS BEEN CONSIDERABLE DISCUSSION ABOUT "PERCEPTIONS" VERSUS "REALITY" AS TO THE EXISTENCE OF AN

ANTITRUST IMPEDIMENT TO R&D COOPERATION. I ASSURE YOU THERE IS SUCH A PERCEPTION; AND THE CRITICAL REALITY IS THAT SUCH COOPERATION HAS BEEN, IS, AND WILL CONTINUE TO BE, DETERRED UNLESS SOME ACTION IS TAKEN TO CLARIFY THE ANTITRUST LAW AS APPLIED TO SUCH ACTIVITY.

ULTIMATELY, WE WERE SUCCESSFUL IN FORMING MCC--AND SOME HAVE MISTAKENLY INTERPRETED THIS AS A SIGN THAT LEGISLATIVE CLARIFICATION IS UNNECESSARY. SUCH SPECULATION NOT ONLY IGNORES THE ANTITRUST-INSPIRED OBSTACLES WHICH CHARACTERIZED AND DELAYED MCC'S FORMATION, BUT IGNORES THE FACT THAT THE LAUNCH OF MCC IS BUT THE FIRST STEP IN ITS JOURNEY. AND ALREADY:

- A SAN FRANCISCO ANTITRUST LAWYER, WHO GENERALLY REPRESENTS TREBLE-DAMAGE PLAINTIFFS, HAS WRITTEN A THREATENING LETTER TO EACH MCC SHAREHOLDER, APPEARED ON NATIONWIDE TELEVISION AND BEFORE THE HOUSE JUDICIARY COMMITTEE DENOUNCING RESEARCH JOINT VENTURES, INCLUDING MCC.

- THE JUSTICE DEPARTMENT HAS OPENED ANOTHER EXPANSIVE INVESTIGATION OF MCC.

SUCH EVENTS ARE CERTAINLY A "WARNING" TO OTHER POTENTIAL JOINT VENTURERS. MOREOVER, THE SIMPLE FORMATION OF MCC DOES LITTLE TO PLACATE THE GENERAL PERCEPTION BY EXECUTIVES THAT THE ANTITRUST RISKS OF COOPERATIVE R&D OUTWEIGH ITS BENEFITS. THIS IS BECAUSE THE INCENTIVES TO ATTACK VENTURES GENERALLY DO NOT PEAK UNTIL YEARS AFTER THEIR FORMATION. IT HAPPENS WHEN THEY HAVE BEEN SUCCESSFUL--IN THE SENSE OF DEVELOPING NEW AND USABLE TECHNOLOGIES, WHICH BY DEFINITION CREATE A POTENTIAL CLASS OF PLAINTIFFS WHOSE "OX HAS BEEN GORED" BY THE APPLICATION OF THE NEW TECHNOLOGY TO COMPETITIVE PRODUCTS. THUS, EXECUTIVES SENSE A NO-WIN SITUATION--WHERE THERE ARE NOT ONLY THE NORMAL RISKS OF FAILURE BUT ALSO THE ABNORMAL RISKS OF SUCCESS.

IN SUM, BOTH THE HISTORICAL ABSENCE OF SIGNIFICANT COOPERATION AND THE MCC EXPERIENCE ITSELF CONSTITUTE GRAPHIC RESPONSES TO THOSE QUESTIONING THE NEED FOR CONGRESSIONAL ACTION, AND EXEMPLIFY THE OVER-DETERRENCE OF AN AMBIGUOUS ANTITRUST ENVIRONMENT. IN ORDER TO BRING ABOUT WIDESPREAD COOPERATION, WE NEED TO CHANGE THE TENOR OF CURRENT LAWS--FROM LAWS THAT SOMETIMES PERMIT TECHNOLOGICAL COOPERATION--TO LEGISLATION THAT ENCOURAGES IT.

4. LEGISLATIVE PROPOSALS--AN ACKNOWLEDGMENT OF NEED.

MR. CHAIRMAN, I BELIEVE THE CONGRESS IS READY TO RESPOND. THE LARGE NUMBER OF BILLS THAT HAVE BEEN INTRODUCED IS ENCOURAGING; THEY DISPLAY BOTH AN UNDERSTANDING OF THE PROBLEMS AND A WILLINGNESS TO ADDRESS THEM.

TO DATE, I AM AWARE OF HOUSE AND SENATE BILLS REFLECTING ONE OR MORE OF SIX PRINCIPLES; ALTHOUGH THE SPECIFIC LANGUAGE OF EACH PRINCIPLE OR COMBINATION OF PRINCIPLES VARIES, IN GENERAL THEY WOULD PROTECT JOINT VENTURE "R&D ACTIVITY" (AS DEFINED) UNDER THE FOLLOWING CIRCUMSTANCES:

A. NO DAMAGE LIABILITY IF THE VENTURE MEETS LEGISLATIVELY PRESCRIBED STANDARDS. (H.R. 1952--SYNAR; H.R. 3393--SENSENBRENNER; H.R. 4043--FUQUA; AND S.737--MATHIAS);

B. NO DAMAGE LIABILITY IF THERE IS A PRIOR DISCLOSURE OF VENTURE ACTIVITIES TO THE DEPARTMENT OF JUSTICE (HR 4043 - FUQUA);

C. NO DAMAGE LIABILITY IF THERE IS A PRIOR DISCLOSURE OF VENTURE ACTIVITIES TO DEPARTMENT OF JUSTICE AND THE DEPARTMENT OF JUSTICE ISSUES A CERTIFICATE (S.1383--GLENN; S.568--TSONGAS);

D. LIABILITY LIMITED TO ACTUAL (SINGLE) DAMAGES FOR R&D ACTIVITIES (H.R. 3393--SENSENBRENNER; H.R. 3641--FISH; H.R. 4043--FUQUA; AND S.1561--DOLE);

E. LIABILITY LIMITED TO ACTUAL DAMAGES IF THERE IS A PRIOR DISCLOSURE OF VENTURE ACTIVITIES TO THE DEPARTMENT OF JUSTICE. (H.R. 3878--MOORHEAD AND S.1841--THURMOND/ADMINISTRATION);

F. LIABILITY LIMITED TO ACTUAL DAMAGES IF THERE IS A PRIOR DISCLOSURE OF VENTURE ACTIVITIES TO THE DEPARTMENT OF JUSTICE AND THE DEPARTMENT OF JUSTICE ISSUES A CERTIFICATE (H.R.108--EDWARDS);

G. RECOVERY OF COSTS/ATTORNEYS FEES BY SUCCESSFUL DEFENDANTS. (H.R. 108--EDWARDS; H.R. 1952--SYNAR; H.R. 3393--SENSENBRENNER; H.R. 3641--FISH; H.R. 4043--FUQUA).

H.R. 4043 IS A CONSENSUS BILL INCORPORATING IMPORTANT ELEMENTS OF MOST OF THE ABOVE BILLS.

5. NECESSARY LEGISLATIVE PRINCIPLES.

THERE IS AGREEMENT AMONG COMPANIES IN INDUSTRIES WITH WHICH CONTROL DATA IS ASSOCIATED, INCLUDING SUCH TRADE ASSOCIATIONS AS THE AEA, THE SEMICONDUCTOR INDUSTRY ASSOCIATION, THE ELECTRONIC INDUSTRIES ASSOCIATION AND THE COMPUTER AND BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, THAT THE MOST EQUITABLE AND EFFECTIVE LEGISLATIVE APPROACH WOULD INCLUDE FOUR PRINCIPLES, MAJOR PARTS OF WHICH ARE CONTAINED IN THE BILLS NOW UNDER CONSIDERATION BY THE CONGRESS. IN THE CASE OF H.R. 4043, THE CONSENSUS BILL, ALL FOUR PRINCIPLES ARE INCLUDED:

- IMMUNITY ON THE BASIS OF MEETING "STATUTORY STANDARDS" (PROPOSAL A, ABOVE);

- IMMUNITY ON THE BASIS OF "DISCLOSURE" (PROPOSAL B ABOVE);

- A SINGLE-DAMAGE "SAFETY-NET" FOR R&D ACTIVITIES (PROPOSAL D, ABOVE); AND

- ATTORNEYS' FEES FOR PREVAILING PARTIES (PROPOSAL G, ABOVE).

I WILL DEVOTE THE MAJORITY OF MY COMMENTS TO THE FIRST OF THESE, BECAUSE THAT IS THE ONLY APPROACH WHICH ADDRESSES THE ROOT CAUSES OF THE CURRENT PROBLEM AND THE BASIC PUBLIC POLICY OBJECTIVE OF WIDESPREAD TECHNOLOGICAL COOPERATION.

THE IDEA OF IMMUNITY FOR R&D VENTURES MEETING CERTAIN PRESCRIBED STANDARDS WAS FIRST PROPOSED IN H.R. 1952, INTRODUCED ORIGINALLY BY REPRESENTATIVES SYNAR, WYDEN, GEPHARDT AND ZSCHAU, AND S.737, INTRODUCED ORIGINALLY BY SENATORS MATHIAS, HART, SPECTER, AND BAUCUS. THE MOST IMPORTANT POINT IN THIS WHOLE MATTER, IS THE NEED TO ENCOURAGE COOPERATIVE R&D WITHOUT DISMANTLING THE BASIC BODY OF ANTITRUST LAW WHICH HAS SERVED THIS COUNTRY SO WELL. THE APPROACH OF HAVING LEGISLATIVELY PRESCRIBED STANDARDS DOES PRECISELY THAT. SUCH AN APPROACH DOES NOT CHANGE OUR ANTITRUST LAWS; RATHER IT CLARIFIES OR SPECIFIES IN ADVANCE, IF YOU WILL, THE "RULE OF REASON" AS IT RELATES TO COOPERATIVE R&D.. UNDER THIS APPROACH, CONGRESS WOULD PRESCRIBE STATUTORY CRITERIA FOR LAWFULLY ORGANIZING AND CONDUCTING JOINT R&D VENTURES WHICH, IF

MET, WOULD SHIELD A VENTURE FROM ANTITRUST ATTACK. THIS WOULD REMOVE EXISTING UNCERTAINTY BECAUSE, UNLIKE OTHER PROPOSALS, COMPANIES WOULD KNOW IN ADVANCE HOW TO ORGANIZE AND CONDUCT THEIR R&D JOINT VENTURES.

IF A VENTURE COMPLIES AND CONTINUES TO COMPLY WITH THESE STANDARDS, ITS R&D ACTIVITIES WOULD NOT BE SUBJECT TO EITHER CRIMINAL OR TREBLE DAMAGE LIABILITY. OF COURSE, ACTIVITIES FALLING OUTSIDE OF THE STANDARDS OR NOT INVOLVING "R&D", WOULD REMAIN FULLY SUBJECT TO THE DUAL DETERRENTS OF GOVERNMENTAL AND PRIVATE DAMAGE ACTIONS.

WE PREFER THIS APPROACH OVER ONE WHICH WOULD REQUIRE ANY VENTURE TO BE "CERTIFIED" BY THE JUSTICE DEPARTMENT (PROPOSAL F ABOVE). WE DO NOT THINK IT EITHER NECESSARY OR DESIRABLE THAT ANOTHER BUREAUCRACY BE CREATED TO SOLVE THIS PROBLEM. WE WOULD PREFER A LAW THAT THE FIRMS DESIRING TO COOPERATE COULD THEMSELVES UNDERSTAND AND APPLY. FURTHER, TO BE SUCCESSFUL, RESEARCH AND DEVELOPMENT MUST REMAIN FLUID, WITH ONGOING RESEARCH CONSTANTLY REVIEWED AND REDIRECTED IN LIGHT OF EXPERIENCE PROVIDED BY PREVIOUS ACHIEVEMENT OR LACK THEREOF. A RIGID CERTIFICATE AUTHORIZING CERTAIN DESCRIBED VENTURE ACTIVITIES IS JUST NOT APPROPRIATE TO THIS ENVIRONMENT.

FOR SIMILAR REASONS, WE ALSO PREFER THIS APPROACH TO THOSE BILLS WHICH DO NOTHING TO CLARIFY THE LAW, BUT RATHER RELY SOLELY ON "DISCLOSURE" (AS IN PROPOSAL E, ABOVE). SUCH "DISCLOSURE" OF NECESSITY CARRIES WITH IT AN ASSUMPTION OF "INVESTIGATION, REVIEW, AND APPROVAL OR DISAPPROVAL"--WHICH AGAIN TRANSLATES TO BUREAUCRACY. AND WHILE IT AFFORDS A DEGREE OF PROTECTION FOR "CONDUCT" THAT HAS BEEN DISCLOSED IN ADVANCE TO THE DEPARTMENT OF JUSTICE, SINCE RESEARCH ACTIVITIES ARE BY DEFINITION IN FLUX, ONE CAN ENVISION WEEKLY OR MONTHLY FILING BY VENTURES SUMMARIZING THEIR UPCOMING ACTIVITIES, THEREBY CONVERTING AN ENFORCEMENT AGENCY INTO A REGULATOR. SUCH "MONITORING" IS SURELY UNNECESSARY IN THE VAST MAJORITY OF CASES, AND SUCH REQUIRED DISCLOSURE COULD IN FACT INHIBIT THE FORMATION OF NEEDED VENTURES DUE TO PROPRIETARY CONCERNS. MOREOVER, THE "DISCLOSURE" BILLS, BY IN EFFECT AFFIRMING CONTINUED AMBIGUITY IN THE LAW, PROVIDE NO GUIDANCE AT ALL TO THE PRIVATE SECTOR AND, IN FACT, MANY FIRMS WILL REMAIN UNWILLING TO MAKE MULTI-MILLION DOLLAR COMMITMENTS WHERE THE DEGREE OF PROTECTION IS SUBJECT TO REMOVAL AT ANY TIME IN THE DISCRETION OF TRANSIENT ENFORCEMENT OFFICIALS WHOSE VIEWS OF ANTITRUST ENFORCEMENT ARE BY DEFINITION UNPREDICTABLE.

THE "DISCLOSURE" CONCEPT HAS A VERY USEFUL ROLE, AS AN

ADDITIONAL OR OPTIONAL "TRACK" TO IMMUNITY. IT AFFORDS AN OPPORTUNITY FOR VENTURES THAT WERE EITHER UNSURE AS TO WHETHER THEY FIT THE LEGISLATIVELY PRESCRIBED STANDARDS OR THAT ELECTED NOT TO MEET THEM (BUT WERE CLEARLY PRO-COMPETITIVE ANYWAY) TO BE GIVEN SOME ASSURANCE, IN ADVANCE, THAT THEIR R&D ACTIVITIES WOULD NOT BE SUBJECTED TO DISTANT-FUTURE SECOND-GUESSING. IN OTHER WORDS, IT COULD BE USED TO COVER THE "GREY AREA."

EXCEPT FOR H.R. 4043, THE "CERTIFICATION"/"DISCLOSURE" BILLS ARE ALSO COUPLED WITH A CONTINUING EXPOSURE OF THE VENTURE TO "SINGLE" DAMAGES. SUCH PROPOSALS NOT ONLY SIGNAL A SOMEWHAT AMBIGUOUS CONGRESSIONAL COMMITMENT TO THIS PROBLEM, BUT IGNORE THE FACT THAT IT IS THE POTENTIAL LAWSUIT ITSELF THAT IS OFTEN THE REAL DETERRENT--NOT ONLY ARE ACTUAL DAMAGES INHERENTLY SPECULATIVE AND, TOGETHER WITH ATTORNEYS' FEES, POTENTIALLY LARGE IN AND OF THEMSELVES, BUT THE "OVERHEAD" OF LITIGATION TO PARTICIPANTS IS OFTEN THE PRIMARY CONCERN OF EXECUTIVES CONSIDERING COOPERATION. THUS, WHILE A REDUCTION TO SINGLE DAMAGES MAY BE VIEWED AS A COMPROMISE, AND WOULD CERTAINLY BE AN IMPROVEMENT, IT LEAVES IN PLACE CONSIDERABLE INCENTIVES FOR THE FILING OF SPURIOUS SHAKE-DOWN SUITS BY PRIVATE PLAINTIFFS AND THUS RETAINS WHAT IS TODAY THE MAJOR DETERRENT TO THE DEGREE OF R&D COOPERATION NEEDED. SUCH INCENTIVES ARE

INAPPROPRIATE FOR VENTURES THAT VOLUNTARILY COMPLY WITH THE REQUIREMENTS OF EITHER THE "STANDARDS" OR "DISCLOSURE" APPROACH, AND "SINGLE DAMAGES" (AS IN H.R. 4043), WOULD BE MORE SUITABLY INVOKED AS A LIMIT ON THE EXPOSURE OF VENTURES WHO CHOSE TO DO NEITHER BUT DO, IN FACT, RESTRICT THEIR ACTIVITIES TO R&D.

6. THE KEY TO EFFECTIVE LEGISLATION.

CONTROL DATA'S PRIMARY CRITICISM OF APPROACHES WHICH DO NOT INCLUDE THE ADOPTION OF SPECIFIC LEGISLATIVELY-PRESCRIBED, OBJECTIVE, STANDARDS IS THAT THEY DO NOT ENCOURAGE THE WIDESPREAD USE OF TECHNOLOGY--WHICH, FROM THE STANDPOINTS OF INTERNATIONAL COMPETITIVENESS AND JOB CREATION ARE AT LEAST AS IMPORTANT AS THE CREATION OF THE TECHNOLOGY IN THE FIRST PLACE.

CONTROL DATA STRESSES THAT CONGRESS MUST NOT LOSE SIGHT OF THE BROAD POLICY GOAL OF ANY LEGISLATION: THAT GOAL IS NOT SIMPLY TO ENCOURAGE R&D COOPERATION, HOWEVER NECESSARY THAT MAY BE. RATHER, THE GOAL MUST BE TO INCREASE THE COMPETITIVENESS OF U.S. INDUSTRIES IN WORLD MARKETS, TO PROMOTE ECONOMIC GROWTH, AND THEREBY TO CREATE JOBS. CREATION OF THE TECHNOLOGY SOLVES ONLY HALF OF THE PROBLEM. THE OTHER HALF--PERHAPS THE MORE IMPORTANT HALF--IS ITS DIFFUSION AND USE FOR THE BENEFIT OF OUR SOCIETY.

CONSIDER THE POSITION OF SMALL OR START-UP BUSINESSES OR FIRMS. BY AND LARGE, MANY OF THESE LACK THE RESOURCES TO EVEN CONSIDER JOINING AN MCC-LIKE ORGANIZATION; EVEN WORKING TOGETHER, SEVERAL SUCH FIRMS COULD PROBABLY NOT MAKE (OR JUSTIFY) THE MASSIVE COMMITMENTS THAT TODAY'S ENVIRONMENT DEMANDS FOR CERTAIN TECHNOLOGIES AND, IN ANY EVENT, PRESENT ANTITRUST LAWS ARE A MINIMAL IMPEDIMENT TO R&D COOPERATION AMONG SUCH FIRMS. SMALL COMPANIES, TYPICALLY MORE INNOVATIVE THAN LARGE FIRMS, ARE PARTICULARLY ADEPT AT PICKING UP ON ADVANCED TECHNOLOGY AND RAPIDLY APPLYING IT IN THE CREATION OF NEW PRODUCTS AND SERVICES . IN SO DOING, THEY CREATE JOBS, AND GREATLY EXPAND OUR NATION'S COMPETITIVE BASE. CONVERSELY, DENYING SMALLER FIRMS ACCESS TO TECHNOLOGY MAY SIGNIFICANTLY REDUCE THEIR CAPACITY TO INNOVATE: INVENTORS STAND ON THE SHOULDERS OF THEIR PREDECESSORS--AND IN ORDER TO MAINTAIN THE PACE OF INVENTIVE ACTIVITY BY SMALLER FIRMS AND INDIVIDUALS, WE HAVE TO KEEP THEM IN THE TECHNOLOGY LOOP. THUS, IT WOULD BE A HIGHLY DESIRABLE NATIONAL POLICY TO MAKE TECHNOLOGY CREATED BY R&D JOINT VENTURES READILY AVAILABLE TO SMALL BUSINESS--WITH REASONABLE REWARDS TO THE CREATORS. THIS IS A PRINCIPAL OBJECTIVE OF THE BILLS THAT CALL FOR LEGISLATIVE STANDARDS AND IS SPECIFICALLY PROVIDED FOR IN H.R. 4043.

SOME IN INDUSTRY AND GOVERNMENT HAVE CRITICIZED A LICENSING REQUIREMENT AS DESTRUCTIVE OF THE INCENTIVES FOR FIRMS "OUTSIDE" A VENTURE TO COMPETE WITH IT IN R&D, AS WELL AS THE INCENTIVES FOR FIRMS TO FORM VENTURES IN THE FIRST INSTANCE; IN THE LATTER CASE, THE ARGUMENT IS THAT GUARANTEED EXCLUSIVITY IS THE PRINCIPAL DRIVING FORCE BEHIND INNOVATION, AND INTERFERENCE WITH IT IS INCONSISTENT WITH AND DESTRUCTIVE OF OUR PATENT SYSTEM. NEITHER CRITICISM IS VALID:

-- FIRST, A LICENSING REQUIREMENT TO SMALL BUSINESS WOULD ONLY APPLY TO COOPERATIVE R&D VENTURES WHO CHOOSE TO MEET THE LEGISLATIVE STANDARDS. RESEARCH BY INDIVIDUAL FIRMS WOULD NOT BE AFFECTED AT ALL, NOR WOULD JOINT RESEARCH UNDERTAKEN BY VENTURES WHICH PERCEIVE LITTLE ANTITRUST RISK AND ELECT NOT TO MEET THE LEGISLATIVE STANDARDS.

-- SECOND, UNDER THIS PROPOSED LICENSING REQUIREMENT, PARTICIPANTS WOULD BE ENTITLED TO AT LEAST THREE-YEARS EXCLUSIVITY, WHICH IN MOST INDUSTRIES TODAY IS AN ETERNITY; FIRMS WHOSE FUTURE IS DEPENDENT ON STATE-OF-THE-ART TECHNOLOGY--WHICH IS REALLY WHAT WE'RE TALKING ABOUT--ARE NOT ABOUT TO SIT ON THE SIDELINES FOR 3 YEARS.

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-- THIRD, LICENSEES WOULD PAY ROYALTIES, REFLECTIVE OF THE RISKS ASSUMED AND THE RESOURCES EXPENDED IN THE CREATION OF THE TECHNOLOGY. THREE-YEAR EXCLUSIVITY PLUS REASONABLE ROYALTIES PROVIDES GENEROUS INCENTIVES TO PROSPECTIVE VENTURERS (WHO ARE PROBABLY DRIVEN MORE BY A DESIRE TO SURVIVE THAN ANY NOTION OF LONG-TERM EXCLUSIVITY ANYWAY); AND THE SAME REQUIREMENTS ARE A SUFFICIENT THREAT TO DETER ANY NON-VENTURE FIRMS FROM THE TEMPTATION TO SIMPLY WAIT FOR ACCESS, PARTICULARLY WHEN THERE CAN NEVER BE A GUARANTEE THAT A VENTURE WILL IN FACT BE SUCCESSFUL IN CREATING BOTH RELEVANT AND USABLE TECHNOLOGY TO LICENSE.

FINALLY, PRESENT PROPOSALS, (SPECIFICALLY H.R. 4043) WOULD LIMIT ANY LICENSING REQUIREMENT TO SMALL BUSINESS. THUS, IN TERMS OF INCENTIVES, THERE IS NO IMPACT ON OUTSIDERS WHO HAVE THE CAPACITY TO PERFORM RELEVANT COMPETITIVE R&D, BECAUSE SMALL BUSINESS LICENSEES GENERALLY LACK THE CAPACITY TO PERFORM THE RESEARCH IN ANY CASE.

THUS ALLEGATIONS THAT SUCH LICENSING "WILL DESTROY THE PATENT SYSTEM" CAN NOT BE SUPPORTED. LICENSING TO SMALL BUSINESS IS SIMPLY A PRICE TO BE PAID BY THE VENTURERS FOR SOME MEASURE OF ANTITRUST CERTAINTY--AND IF A FIRM VIEWS THE PRICE AS TOO HIGH, IT CONTINUES TO HAVE THE MULTITUDE OF CHOICES AVAILABLE UNDER PRESENT LAWS.

NOR ARE WE WITHOUT PRECEDENT IN THIS AREA. AS A RESULT OF THE SETTLEMENT IN 1956 OF AN ANTITRUST SUIT BROUGHT BY THE JUSTICE DEPARTMENT, AT&T WAS FORCED TO LICENSE ALL OF ITS EXISTING PATENTS ROYALTY FREE TO ANY DOMESTIC FIRM AND GUARANTEE LICENSING AT REASONABLE ROYALTY CHARGES ON ALL FUTURE PATENTS. FEAR OF SIMILAR ANTITRUST ACTIONS MAY HAVE ENCOURAGED OTHER LARGE SEMICONDUCTOR FIRMS TO FOLLOW AT&T'S LIBERAL LICENSING POLICY. THIS EASY ACCESS TO IMPORTANT PATENTS IN THE EARLY AND MID-1950S ALLOWED THE FORMATION OF MANY NEW FIRMS, WHICH INCREASED COMPETITION AND SHIFTED THE EMPHASIS FROM LARGE, MULTI-DIVISION FIRMS TO SMALLER, HIGHLY SPECIALIZED FIRMS. (J. TILTON, INTERNATIONAL DIFFUSION OF TECHNOLOGY: THE CASE OF SEMICONDUCTORS (1971); BROOKINGS INSTITUTION, P. 77.)

THIS LESSON IS INSTRUCTIVE FOR TWO REASONS: FIRST, THE EXPLOSION OF INNOVATION AND ENTRY INTO THE SEMICONDUCTOR AND COMPUTER INDUSTRY CAN ONLY HAVE BEEN HELPED BY THIS CONSENT DECREE. SECOND, THE CONSENT DECREE, AND ITS VERY LIBERAL LICENSING REQUIREMENTS, APPARENTLY HAD NO ADVERSE IMPACT ON BELL LABORATORIES AND ITS WILLINGNESS AND CAPACIIY TO DO "WORLD-CLASS" RESEARCH. INDEED, AT&T REMAINS AT THE FOREFRONT OF SEMICONDUCTOR TECHNOLOGY TODAY, SO MUCH SO THAT ONE OF THE COMPLAINTS FREQUENTLY HEARD ABOUT THE SPLIT-UP OF AT&T IS THAT WE HAVE LOST A "NATIONAL RESOURCE"--BELL LABS--IN THE PROCESS.

THIRD, I KNOW OF NO EVIDENCE THAT SEMICONDUCTOR AND COMPUTER FIRMS HAVE REFRAINED FROM UNDERTAKING SIMILAR RESEARCH TO THAT OF AT&T WITHIN THE LIMITED RESOURCES AT THEIR DISPOSAL. FURTHER, I HAVE SEEN NO EVIDENCE THAT THE LEGAL REQUIREMENT PLACED ON FEDERAL GOVERNMENT AGENCIES (OR FOR THAT MATTER THE TRADITIONAL PRACTICE OF U.S. UNIVERSITIES) TO DISSEMINATE UNCLASSIFIED RESEARCH AND ADVANCED TECHNOLOGY RESULTS WIDELY TO INTERESTED PARTIES HAS PROVED TO BE A DETERRENT TO INNOVATION.

ON THE CONTRARY, A RECENT STUDY BY F. M. SCHERER ("THE ECONOMIC EFFECTS OF COMPULSORY PATENT LICENSING"; NEW YORK UNIVERSITY MONOGRAPH SERIES IN FINANCE AND ECONOMICS, 1977) DEMONSTRATED THAT COMPULSORY LICENSING HAS NO NEGATIVE AFFECT ON R&D EFFORT. HIS ANALYSIS OF 1975 RESEARCH AND DEVELOPMENT EXPENDITURES REVEALED THAT 42 COMPANIES SUBJECTED TO COMPULSORY LICENSING DECREES SPENT NO LESS ON R&D RELATIVE TO SALES THAN NONIMPACTED CORPORATIONS OF COMPARABLE SIZE AND INDUSTRIAL ORIENTATION (PAGES 67-75).

REQUIRED LICENSING ALSO HAS A BEARING ON THE OTHER MAJOR LEGISLATIVE STANDARD--MARKET SHARE LIMITATIONS. SUCH LIMITATIONS ARE INCLUDED OUT OF A DUAL CONCERN THAT AN "OVER-INCLUSIVE" R&D JOINT VENTURE WILL (A) ADVERSELY AFFECT RESEARCH COMPETITION AMONG FIRMS IN A PARTICULAR INDUSTRY OR (B) PROVIDE A FORUM FOR "OTHER"--I.E., NON-R&D RELATED--ANTICOMPETITIVE ACTIONS ON THE PART OF VENTURE PARTICIPANTS (THE "SPILLOVER" EFFECT). AS IN OTHER ANTITRUST CONTEXTS, "MARKET SHARE" IS PROPOSED AS, IN EFFECT, A PROXY FOR DIRECT EVIDENCE OF SUCH EFFECTS.

BUT TRADITIONAL NOTIONS OF "MARKET SHARE" DO NOT FIT THE R&D CONTEXT. DEFINING MARKETS IN TERMS OF EXISTING PRODUCTS OR SERVICES IS INHERENTLY WIDE OF THE MARK, AND SPECULATION ABOUT FUTURE PRODUCTS AND SERVICES SIMPLY ADDS ANOTHER LEVEL OF SUBJECTIVITY TO WHAT IS ALREADY, IN MANY INSTANCES, AN ARBITRARY SURROGATE FOR ACTUAL PROOF OF ANTICOMPETITIVE EFFECTS. I SUGGEST THAT REQUIRED LICENSING IS A BETTER AND MORE EFFECTIVE CHECK ON POSSIBLE "MARKET POWER" ABUSE BY POTENTIALLY OVER-INCLUSIVE VENTURES (AS THE JUSTICE DEPARTMENT RECOGNIZED IN ITS 1956 AT&T CONSENT ORDER).

ONE FINAL NOTE: IN ADDITION TO THE APPROACHES THAT I HAVE DESCRIBED, WE AGREE WITH PROVISIONS IN ALMOST ALL BILLS WHICH, IN RECOGNITION OF THE CRITICAL IMPORTANCE OF R&D TO OUR COUNTRY'S FUTURE, PROVIDE THAT: IN ANY LITIGATION ARISING OUT OF SUCH ACTIVITY, ATTORNEYS' FEES SHOULD BE AWARDED TO THE PREVAILING PARTY--DEFENDANTS AS WELL AS PLAINTIFFS. THIS LAST PROVISION IS DESIRABLE TO BRING DISCIPLINE TO THE UNFORTUNATELY MUSHROOMING BUSINESS OF SHAKEDOWN LAWSUITS WHENEVER ALLEGEDLY "DEEP POCKET" DEFENDANTS ARE A POTENTIAL TARGET.

7. CONCLUSION.

MR. CHAIRMAN, WE URGE THIS COMMITTEE TO LOOK FAVORABLY ON LEGISLATION EMBODYING THE PRINCIPLES I HAVE DESCRIBED. WE BELIEVE THESE PRINCIPLES, AS CONTAINED IN H.R. 4043, WILL MAKE A SIGNIFICANT CONTRIBUTION TO FOSTERING THE CREATION AND USE OF TECHNOLOGY, AND THEREFORE TO ENHANCING OUR NATION'S INTERNATIONAL COMPETITIVENESS, AND QUALITY OF LIFE AND NATIONAL SECURITY.

Representative LUNGREN. Thank you, Mr. Lacey. We will get back to you during the questions.

Next we have Mr. Gary Saxonhouse, professor of economics at the University of Michigan.

STATEMENT OF GARY R. SAXONHOUSE, PROFESSOR OF ECONOMICS, UNIVERSITY OF MICHIGAN

Mr. SAXONHOUSE. Congressman Lungren, it gives me great pleasure to appear before you today to discuss what might be learned from Japanese policy toward joint research and development ventures. The reexamination of our antitrust statutes with specific reference to the consequences for international economic competition has my enthusiastic support. As the committee is doing, particular attention needs to be given to how these statutes might affect joint R&D ventures.

In understanding the role which joint R&D ventures play in Japan, we must appreciate that the United States and Japanese economies differ by more than just a somewhat different attitude toward these joint R&D ventures. While both Japan and the United States are part of the same international economic system, there remain profound differences in the institutions of the two economies. The utility of any particular practice in Japan might result from the special presence or absence of some other institution in the Japanese economy.

Let me be specific. The highly publicized Japanese- Government-sponsored research and development ventures serve an important signaling function in Japan. They communicate to Japan's financial community that a particular activity and industry is of considerable future importance to the Japanese economy, that the Government stands behind this industry, and that the private financial system should actively participate in the development of this industry.

This is an extremely important function for such projects in Japan, but it is hard to see that such a role is desirable or necessary for such projects in the United States. Unlike our financial system, the Japanese financial system remains heavily regulated. Venture capital institutions are unimportant, and the supply of capital is not freely competitive. Resource allocation decisions are made bureaucratically, and in the absence of a lot of drama, public/private consensus decision-making has little capacity to move rapidly. Government-sponsored joint research and development ventures in Japan are a solution to a number of problems which have historically become important in Japan.

In this specific role, it is a solution to a problem which does not exist in the United States. By comparison with Japan, the U.S. financial system has shown a remarkable capacity, perhaps too remarkable a capacity, to put resources into promising new high-technology areas.

Joint research and development projects are also important in Japan because relative to other industrialized economies, and particularly the U.S. economy, there is much less informal communication and cooperation among scientists working at different firms. In the United States the diffusion of nonproprietary but nonetheless vital research results across firms, is possible because of a high degree of professional orientation among U.S. firms scientists and engineers.

This pattern has developed because of the strong common theoretical background of American university-trained R&D staffs, which

not only facilitates communication but also creates labor market related incentives for communicating effectively with R&D workers at other firms.

By contrast with the United States, in Japan most advanced managerial and scientific training is done under firm auspices. While a Ph. D. is almost a prerequisite for active participation in many U.S. corporate laboratories, such advanced degree is found much less commonly in otherwise comparable Japanese facilities.

For example, while it is generally recognized that the future prospects of Japan's biotechnology industry are no worse than those of the American industry, Japan's biotechnology firms employ only some 5 to 10 percent of the number of Ph. D.'s employed in American biotechnology firms.

Firm training, as opposed to university training, means a research staff is more closely suited to a firm's needs. But it also makes for a more insular, less professionally oriented corporate research community in Japan by contrast with the United States. Lack of common training of researchers working at different firms makes for much less informal trading of information at fewer numbers of professional meetings than in the United States.

In the United States we know that industries as diverse as semiconductors and steel have benefited from such informal cooperation. To the extent that such informal exchanges are useful, and to the extent that they are facilitated by having professionally oriented technical and managerial personnel, it is quite possible that Japan, by virtue of its permanent employment system, does have a competitive handicap. Thus, the Japanese Government's interfirm cooperative research projects are at least in part an effort to insure that Japanese R&D efforts do not become, by virtue of Japan's permanent employment system, still more narrowly firm-specific than is true in the United States. Rather than an effort to pool R&D resources in a way not possible in the United States to create special competitive strengths, such projects may alternatively be viewed as a substitute for the unusual degree of informal interfirm communication which takes place among the more professionally oriented R&D personnel in the United States. Again we see joint R&D ventures as a solution to get another situation that is a Japanese problem, not an American problem.

Now, having said two functions in Japan that joint R&D ventures do fulfill, let me underline one function that they do not fulfill in Japan. Japanese joint R&D ventures are not research cartels. In light of actual industrial performance in Japan, it is hard to imagine Japanese Government-sponsored cooperative research and development projects as the fulcrum around which all industry research and development pivots. Even in the most celebrated instances, such projects involve only a small amount of the total R&D done for any technology. Firm performance is too diverse to make credible the charge that such projects are the foci of industrywide research and development cartels.

Many Japanese and non-Japanese firms left outside the joint research and development ventures have developed new processes and products with equivalent speed to the joint venture themselves. This has been true from 64K RAM's through machine tools to elements of bioreactors.

Precisely because they are not a research cartel, joint R&D ventures in Japan do serve some functions which should be usefully emulated in this country. They are effective and they have not stifled competition in most instances. They have worked to diffuse information among Japanese firms, and in this way they have served competitive purposes.

In some cases this has been the result of Japanese Government intentions. In other instances, the reluctance of Japanese industry leaders to participate in government-sponsored R&D projects has accomplished this end independently.

Specifically, how does Japanese antitrust practice cope with joint research and development ventures.

While antitrust enforcement is lax in Japan by U.S. standards, the basic provisions of Japan's antimonopoly law are quite rigorous. There are, however, several provisions in articles 21 through 24 of Japan's antimonopoly law, which specifically permit several types of legal cartels, including joint research and development ventures.

For example, rationalization cartels are permitted under article 24.4 for industries when there is a recognized need for certain concerted activities, such as advancing technology, improving quality and efficiency, and reducing costs.

In addition to the favorable language in the 1977 revision of the Antimonopoly Law, there are 39 statutes which allow the formation of cartels exempt from this law. One of these statutes is the Research Association Law, which was enacted in 1961 and revised in 1963. The Research Association Law allows several companies to pool their financial personnel and capital resources to do longer term research and development work. The research association must be set up on a nonprofit basis and for a specified topic. Assets donated to this research association can be immediately expensed.

Primarily for this reason, I should point out, the Ministry of Finance has granted research association status in only 51 instances in the 20 years that the law has been on the books. And the tax expenditures by the Japanese Government associated with the granting of research and development association status comes to no more than $17 million in 1983. In almost all such instances, the associations were approved in some part because the research and development work, in which they were planning to engage, would also include the participation of some Japanese Government ministry or agency.

There is much joint research—usually, I should point out, intra-industrial group joint research—which does go on in Japan which does not receive the tax benefits associated with research association status. Similarly, many participants in ventures which do not receive research association status are not involved in cooperative research at all.

In addition to the Research Association Law, there are other statutes I have enumerated for the record but which I won't go into which also provide exemptions from the Japanese Antimonopoly Law for the purpose of doing joint research.

I think the bottom line of all this is that in the 36 years since the enactment of Japan's Antimonopoly Law, there has never been a case brought under it which alleged any conflict between the Japanese Antimonopoly Law and the Japanese Intellectual Property laws. Thank you very much.

[The prepared statement of Mr. Saxonhouse follows:]

Prepared Statement of Gary R. Saxonhouse

Mr. Chairman, Members of the Committee, it gives me great pleasure to appear before you today to discuss industrial policy, in general, and, in particular, what might be learned from Japanese policy towards joint research and development ventures. The re-examination of the Anti-trust Statutes with specific reference to the consequences for international economic competition has my enthusiastic support. As the Committee is doing, particular attention does need to be drawn to how these statutes might affect joint research and development activity.

I. The Context of Japan's Government Sponsored Research and Development Ventures.

Whenever Japanese policies towards its high technology industries are examined, it is always surprising to discover the small amount of explicit help given to them. Indeed, in most instances, it is now apparent that Japan gives less financial help to its high technology sectors than do the governments of most other advanced industrialized economies.[1] Consider the following:

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[1] This observation is discussed in more detail in Gary R. Saxonhouse, "What's This About Japanese Industrial Targeting?" World Economy (September, 1983); in Gary R. Saxonhouse, "Statement Submitted to United States International Trade Commission," June 15, 1983, and in Gary R. Saxonhouse, "The Micro- and Macroeconomics of Foreign Sales to Japan" in William Cline (ed.) Trade Policy for the 1980s (Cambridge, Mass.: MIT Press for the Institute of International Economics, 1983).

1. There are no currently significant explicit quotas and tariffs on high technology products coming into Japan.

2. High technology sectors receive only negligible subsidies from the Japanese Government. Government contract research awards, while non-trivial, are much smaller than research awards given the private sector in the United States and Europe.

3. Tax rates in Japan are far less discriminatory between sectors than is true in the other advanced industrial economies. The Japanese R&D tax credit is modest in fiscal advantage when compared with the R&D tax credit adopted in the U.S. as part of the 1981 tax reforms.

4. The largest portion of the resources of such government financial institutions as the Japan Development Bank and the Small Business Finance Corporation are not used for promising new industries. The loans which are made from these sources for the promotion of new technologies are granted on terms which are not radically different from what could be available from private banks.

If the amount of explicit government financial aid to Japan's promising new industries is really relatively small, does this mean the Japanese Government does not play a significant role in the promotion of new industries in Japan? Not necessarily. It is possible that it is not the total amount of financial aid given by the Japan Government that is important. Rather than its amount, what may be critical is the simple indication of Japan Government interest. This indication of interest may stand at the center of all manner of complementary policy actions taken by the Japanese Government. Each of these policy steps may be very small but taken together they could constitute a powerful web of support.

II. The Role of Government-Sponsored Joint Research and Development Ventures.

One instrument the Japanese Government does use to indicate interest in a new technology is the sponsorship of highly-publicized research and development programs involving a number of potential competitors. Such firms work together in concert with Japanese Government research institutes and under Japanese Government co-ordination in order to achieve some product or process objective. The seeming success of such tactics has led to widespread calls in the United States for similar programs. For example,

> The problem is not to pick the sunrise industries of the year 2000. No one can do that. The problem is to strengthen the industries that are now sunrise industries and to promote cooperation between public and private institutions on research and development projects that might lead to the sunrise industries of the year 2000. In Japan such private-public cooperative research projects are the heart of MITI's current industrial development strategy. They ought to be at the heart of ours since they avoid the charge that government funds are being used unfairly to "subsidize" the research effort of this or that private firm. Any firm that wants to cooperate in a specific joint research project and is willing to contribute its share of the funds can participate.[2]

Considering this great interest in Japanese private-public joint research projects, it is particularly important that the character and scope of these projects within the Japanese economy be understood. Does the legal and administrative

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[2] Lester Thurow, "How to Rescue a Drowning Economy," New York Review of Books, April 1, 1981.

framework of the Japanese economy allow these projects to serve as the critical centerpiece of an inexpensive but extremely efficacious Japanese Government policy of industrial targeting?

There are at least two significant strands to the analysis of the role of these projects as possible centerpieces in an industrial targeting strategy. First, such projects it is argued are not intrinsically significant. Rather the inauguration of such projects is similarly a particularly effective means for the Japanese Government for communicating to Japan's closely regulated and heavily concentrated financial system that a particular activity and industry is of considerable future importance to the Japanese economy, that the Government stands behind this industry and that the private financial system should actively participate in the development of this industry.

The second related strand in this discussion emphasizes that with public-private joint research and development ventures a small dose of government aid and a large dose of government participation helps diverse Japanese companies to coordinate their research. It is hypothesized that by preventing duplication of effort and by sharing information the Japanese Government-sponsored research and development projects become the fulcrum around which an industry's research and development expenditure pivots.

A. Joint Research and Development Ventures and Signaling.

A highly publicized public-private joint research and development project may be a signal to private finance to get involved, but in doing this it may be simply substituting, and not necessarily very well for that matter, for the presence in Japan of well-developed American style equity markets.

American equity markets have a history of great success in concentrating large resources on very promising, but risky ventures on the technological frontier. For example, since 1979 American equity markets have raised $4.5 billion for American high technology firms having net worths under $5 million.[3] Of this $4.5 billion, one-third has been directed to the research activities of small-scale biogenetic engineering firms. In Japan, the government has regularly indicated the development of biotechnology as a priority by the announcement of a number of significant joint research and development projects; yet despite enormous discussion, resources have been relatively slow to move to this area. In Japan's heavily regulated financial system, where venture capital institutions are unimportant and where the supply of capital is not freely competitive, resource allocation decisions are made bureaucratically

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[3] "Industrial Policy, Part 2: Is a New Deal the Answer?" Manhattan Report on Economic Policy, Vol. 3, No. 2, p. 17.

and government-business consensus decision-making has little capacity to move quickly. Excluding pharmaceutical firms, the total value of U.S. industrial research and development rose from $80 million in 1979 to between $500 and $700 million in 1981. By contrast, in Japan in 1981, the value of industrial research and development in biotechnology, again excluding pharmaceuticals, came to $50-$70 million. Similarly, when industrial research and development expenditure in biotechnology increased in the United States between 1980 and 1982, between six- and nine-fold, in Japan during the same period R&D expenditures in biotechnology increased by only 2 to 2½ times.[4]

Whether the characteristic American response indicates a bold, farsighted commitment of resources through the marketplace to insure an important role in the dynamic industries of the twenty-first century or a faddish over-reaction; and whether the Japanese response indicates a prudent assessment of the level of resources actually required now to participate in the future growth of a new technology or rather an inevitably inadequate response by cumbersome financial bureaucracies remains an open issue. It is clear, however, that whatever Japanese industrial policy may accomplish it does not provide the Japanese economy with a unique capacity to search out promising new technologies and concentrate large new resources on their development.

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[4] Japan Federation of Economic Organization, Committee on Life Sciences, Survey.

It is indeed significant that during the past two years when there has been so much interest in the United States on the special measures used in Japan to allocate capital resources, there has been a complementary interest in Japan on the special mechanisms by which the U.S. allocates capital. Indeed, in response to pressure from Japanese firms who have to compete with American firms who have easy access to large venture capital resources the Japanese Government has been moving during the past year to develop a new venture capital and the over-the-counter equity market institutions.

B. Japanese Government-Sponsored Joint Research Programs and Research Cartels.

In light of actual industrial performance in Japan it is hard to imagine Japanese government-sponsored research and development projects as the centerpiece around which all industry research and development expenditure is organized. For example, between 1977 and the present the Japanese machine tool industry has been the beneficiary of a $44 million MITI sponsored co-operative research project on laser-using complex manufacturing systems. This project which is very large by Japanese standards, was one of ten which during the late 1970s MITI had given special priority designating it a Large-Scale National Research and Development Project.[5] It is unlikely, however, that such

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[5] Kagaku gijutsu cho (Science and Technology Agency) Kagaku gijutsu hakusho (Science and Technology White Paper) (Tokyo, 1978).

a project despite involving the cooperative effort of twenty Japanese firms, could really be the centerpiece for the intimate co-ordination of collusive activities by members of the Japan machine tool industry.

In fact, during just the six-year period that this National Research and Development Program has been ongoing, the Japan machine tool industry has experienced extremely rapid growth which has created as much upheaval within the industry as it has among its foreign competitors. The Japanese machine tool company which was the leading machining center producer in 1981 with almost twice as much production as the number two wasn't even among the top ten producers of machining centers in Japan in 1975. Indeed, the ten top Japanese machine tool producers who in 1975 had produced 80.5% of all machining centers were producing only 46.2% of all machining centers just six years later.[6] During this period a new group of Japanese machine tool companies, some of whom had been small, family-owned firms in the early 1970s and some of whom had not participated at all in the MITI sponsored project, have assumed positions of technological leadership. And some of the firms which had been dominant in 1975 have been forced to undergo very painful readjustment in their capacity and labor force.

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[6] Data taken from the Japan Machine Tool Builders Association.

III. Public-Private Joint Research and Development Venture and the Labor Market for Scientific and Engineering Personnel.

If the high profile Japanese Government sponsored co-operative research and development projects are not research pivots around which an industry cartel functions, what is their role? Cooperative research and development projects are particularly important in Japan in substantial measure because in Japan, relative to other industrialized countries and particularly the U.S., there is much less informal communication and cooperation among scientists and engineers working at different firms. In the United States, for example, the diffusion of useful research results across firms is possible because of the high degree of professional orientation among firm scientists and engineers. This pattern has developed in the United States because of the strong, common theoretical background of university-trained R&D staff which not only facilitates communication but also creates labor market related incentives for communicating effectively with R&D workers at other firms.

Between Japan and the United States, the roots of these different patterns of communication lie in the very different means of financing training. In the United States, from the beginning of the post-war period there have been a number of extremely significant programs to either directly subsidize skill accumulation or to facilitate the use of financial intermediaries for financing such accumulation. These programs,

which include Veterans Educational Benefits, which began with the G.I. Bill of Rights, and Guaranteed Student Loans, almost all require that training be done in educational institutions which are in some fashion officially accredited. In consequence, these programs have helped to greatly increase the demand and therefore in time, the supply, of vocational, undergraduate and, in this context what is most important, graduate education in the United States.

In Japan, in the post-war period, skill accumulation has been institutionalized in a rather different way. There have been no major government programs directly subsidizing individual education. There has been rather a relatively modest increase in the number of heavily subsidized public institutions, which provide education at a very low tuition. For the most part, however, the very large increase in the number of Japanese receiving higher education has been at private universities which finance themselves largely out of tuition charges. These major differences between Japan and the U.S. in the financing of higher education has led to major differences in the character of educational institutions in the two countries, to major differences in the character of the education and ultimately to major differences between the Japanese and American labor market.

In the United States, government programs have almost exclusively subsidized training which takes place outside the

firm. This has resulted in the development in the United States of a large number of graduate research institutions and professional schools. American firm managers and scientific personnel receive a relatively large amount of their training outside the firm. Relatively speaking, this training is general and theoretical in character. Such training is consistent with the academic character of the institutions imparting the training.

By contrast, in Japan, most advanced managerial and scientific training is done under firm auspices. Thus, while the Ph.D. is almost a prerequisite for active participation in the U.S. corporate R&D laboratory such an advanced degree is much less commonly found in otherwise comparable Japanese facilities. For example, while it is generally recognized that the future prospects of Japan's biotechnology industry are no worse than those of the American biotechnology industry Japan's firms employ only 5-10% the number of Ph.D.'s employed in the American biotechnology industry.[7]

Japanese industry has apparently discovered that there are cheaper ways to obtaining the relevant R&D skills than sending large numbers of employees through doctoral programs. Often the right mix of skills and information can be obtained by using foreign consultants on a temporary basis. The

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[7] Ministry of International Trade and Industry and Office of Technology Assessment - National Academy of Sciences Surveys.

resulting training which Japanese personnel receive is less general and less theoretical than what might be received in extra-firm institutions in the U.S., but it is more closely coordinated with the Japanese firm's actual needs. Skills specific to the firms' needs are imparted. There is little or no emphasis on turning out well-rounded members of a profession, occupation or craft. It is commonplace to note how few lawyers per capita there are in Japan relative to the United States and Western Europe.[8] While this is often incorrectly attributed to a homogeneous Japanese society which has informal mechanisms for conflict resolution, it is rather the simple consequence of the Japanese educational system not offering many opportunities for advanced professional training. The United States has thirty times the number of lawyers in Japan, but it also graduates thirty-six times the number of Ph.D. graduates in biology as Japan does each year and ten times the number of Ph.D. graduates in chemistry.[9]

The differing locus and emphasis of training in Japan has led to much lower mobility between firms than in the United

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[8] Frank Upham, "Litigation in Japan," in Bradley M. Richardson and Taizo Ueda (ed.) Business and Society in Japan (New York: Praeger Publishers, 1981).

[9] Mombushō (Ministry of Education), Gakkō kihon chōsa hokukushō (Report on the Survey of Schools) (Tokyo, 1979); National Center for Educational Statistics, Digest of Education Statistics 1982 (Washington, D.C., 1982).

States or even Western Europe. It has also led to much less of a professional and occupational orientation in Japan relative to the United States. The American economy's pervasive extra-firm training programs and the American economy's market allocation of skilled and experienced labor also means that by contrast with Japan, large amounts of potentially proprietary scientific information readily become public goods. Both the prospective American employer and the prospective American employee may operate under strong incentives to disclose some proprietary information as a means of signaling quality. Such disclosure can be done directly or in the context of professional association activities. Strong professional identity makes possible the use of professional association activities as a lever to job mobility.

Professionally oriented, potentially mobile managers and technical personnel might be implicitly disclosing potentially proprietary information in order to enhance their employment prospects, but they also might be disclosing such information in order to receive in exchange, albeit informally, proprietary information of commensurable value. Such trading of information could, of course, make everyone better off.[10] And such

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[10] E. Rogers, "Technological Information Exchange in High Technology Industries in the Silicon Valley" in D. Sahal (ed.) The Transfer and Utilization of Technological Knowledge (Lexington, Mass.: D. C. Heath, 1981) and Richard R. Nelson, "The Role of Knowledge in R&D Efficiency," Quarterly Journal of Economics, Vol. 97, No. 3 (August, 1982), pp. 453-471.

information swapping can be quite complementary to explicit market transactions in information. Actually, in many instances, such informal trading will be a necessary prerequisite to more formal market transactions.

To the extent that such informal exchanges are useful and to the extent that they are facilitated by having professionally oriented technical and managerial personnel it is quite possible that Japan by virtue of its employment system does have a competitive handicap. More narrowly, the Japanese Government's interfirm cooperative research projects are an effort to insure that Japanese R&D efforts do not become by virtue of Japan's permanent employment system, still more narrowly firm specific than is true in the United States. Rather than an effort to pool R&D resources in a way not possible in the United States to create special competitive strength, such projects may alternatively be viewed as a substitute for the unusual degree of informal interfirm communication which takes place among the more professionally oriented R&D personnel in the United States.

Note also in Japan the interfirm cooperation which does take place is quite secondary to the research and development which each firm conducts independently of cooperative efforts. The MITI and other government agency sponsored cooperative research projects characteristically absorb only a small amount of the resources devoted to research and development in the

area in which the project is undertaken. Quite apart from the already documented relatively small amount of government expenditures on these projects, another indication of the relatively small scope of these efforts is the limited firm fiscal participation in the cooperative research associations which are characteristically created to coordinate firm cooperation and to hold patents resulting from joint activity. The assets which member firms use in connection with research and development done under association auspices can be written down 100% in the first year, yet in 1982 the Ministry of Finance estimate only $17 million in tax revenues were lost from the use of this provision.[11]

Given that a prime purpose of cooperative research projects is the diffusion of information which might otherwise not take place, it is not surprising that Japanese firms with a technological edge in a particular cooperative project area are reluctant to participate in such a project for fear of being forced to disclose important proprietary information. Tanabe Pharmaceuticals, the leading Japanese firm in bioreactors, has not been participating in the MITI Next Generation Technology Program's bioreactor project. Kyowa Hakko, while playing a

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[11] Ōkurashō (Ministry of Finance), Sōzei kyoku (Tax Bureau) Genko sōzei tokubetsu sochi no gaiyo (An Outline of Current Taxation), p. 192.

leading role in one of MITI's Next Generation Technologies projects, is not participating in projects in areas of its greatest strength. Kyowa Hakko, a leader in work on recombinant DNA is not participating in the Next Generation project in this area. Yamazaki Machinery, the Japanese leader in flexible manufacturing systems, originally criticized MITI's Laser-Using Complex Manufacturing Systems project as redundant and ultimately participated in the project only in response to direct pressure from its bank. In a well-known case in 1976, Nippon Telephone and Telegraph, the Japanese leader in very large scale integrated circuit technology at that time, was able to reject, with the intervention of the Ministry of Post and Telecommunications, MITI's request that it directly and intimately participate in what was to become the celebrated VLSI Cooperative Project.[12]

IV. Information Flows and Patents in Japan.

Quite apart from Japanese companies' reluctance to enter into joint research ventures where they are under implicit obligation to disclose uniquely valuable proprietary information, the form of the sponsorship of joint research projects has also discouraged participation. Until the early 1980's, Japanese Government joint research and development ventures had some government financing which was given on a subsidy (or hōjōkin)

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[12] For more detail see Gary Saxonhouse, "Micro- and Macroeconomics of Foreign Sales to Japan," Appendix 2.B.

basis. With this form of financing the patents generated by the sponsored research were held privately. This meant, for example, that better than 950 out of the 1,000 patents generated by MITI's VLSI project are held privately with firms under no special obligation to license the results of this research. Such joint ventures to the extent that they generate jointly-held patents place special obstacles in the path of relatively wide licensing of research results. Under Japanese patent law licenses may not be granted without the unanimous consent of all the joint patent holders.

Since 1981 all major government-sponsored grants have been classified as contract research (itaku kenkyū). Contract research reimburses only direct expenses. This means the time research workers and operating laboratory expenses. No overhead is allowed and any capital equipment purchased is nominally the property of the Japanese Government. Most significantly all patents resulting from contract research also belong to the Japanese Government. This change in financing approach has created a major disincentive for companies to participate in Japan's widely publicized Next Generation Technologies project.

This change in the character of financing of joint research and development ventures was not done at MITI's initiative. For example, MITI had proposed that the Next Generation Technologies project be financed on a subsidy (hōjōkin) basis.

The Ministry of Finance successfully opposed MITI's plans, arguing that the thrust of then Prime Minister Suzuki's Administrative Reform Plan meant no large new subsidies could be given except under the most extreme circumstances. How MITI and other Japanese Government agencies will treat the patents they will come to hold under these new arrangements will be determined on a case-by-case basis. Companies conducting the research on which a particular patent is based will almost surely get some preferential treatment. On the basis of past practice this might be expected to range from a discount on royalty through near exclusive licensing privileges. In view of current controversy with the United States over industrial policy practices, it seems unlikely that MITI and other Japanese Government entities would attempt to prevent foreign access to whatever patents it may come to hold. Note even with the subsidy (hōjōkin) financed VLSI project patents, large numbers of foreign firms (including IBM and Fairchild) have had access to these patents through cross-licensing agreements with participating Japanese firms.

V. Japanese Anti-Trust Laws and Joint Research and Development Ventures.

The Japanese Anti-Monopoly Law was first enacted in 1947 during the U.S. Occupation of Japan and has been revised on three occasions (1949, 1952, and 1977) since that time. Enforcement procedures rest with the Japan Fair Trade Commission, an independent five-person regulatory body modeled after the U.S. Federal Trade Commission.

With the end of the Occupation in 1951, the Anti-Monopoly Law could not be effectively enforced by the JFTC. Its relatively severe anti-monopoly restrictions and prohibitions against cartels drew considerable hostility from the Japanese Government and the powers of the JFTC languished between 1952 and 1969.

The last decade, which saw a successful strengthening of the JFTC legal position in 1977, has seen a marked increase in the JFTC's enforcement activities. For example, in 1980, the JFTC completed 62 cases, 24 of which involved price fixing. It has also ordered 279 businesses to pay a total of $10 million in fines and has prosecuted a wide variety of unfair business practices. Although the JFTC's increase in activity has been marked, it is worth noting that the fines levied are very small in relation to the typical U.S. anti-trust settlement.

The basic provisions of Japan's Anti-Monopoly Law are quite rigorous. Article 1 explains that the purpose of the law is to "eliminate unreasonable restriction of production, sale, price, technology and the like..." Revisions in 1977 reflected a concern for controlling large corporations so that the revitalized market structure could function more effectively. Sections 3 and 6 of the 1977 revisions preclude entrepreneurs from engaging in any unreasonable restraints of trade. Joint research and development ventures could be precluded since Section 2(6) defines "unreasonable restraints of trade" as including those

> "business activities by which entrepreneurs... mutually restrict or conduct their business activities in such a manner as to fix, maintain or enhance prices, or to limit production, technology, facilities or customers, or suppliers."

There are, however, several provisions in Articles 21 through 24 which specifically permit several types of legal cartels including joint and research and development ventures. For example, rationalization cartels are permitted under Article 24-4 for industries when there is a recognized need for certain concerted activities such as advancing technology, improving quality and efficiency and reducing costs.

In addition to favorable language in the 1977 revision of the Anti-Monopoly Law, there are thirty-nine statutes which allow the formation of cartels exempt from the Anti-Monopoly Law. One of the statutes is the Research Association Law which was enacted in 1961 and revised in 1963. The Research Association Law allows several companies to pool their financial, personnel and capital resources to do longer-term research and development work. The Research Association must be set up on a non-profit basis and for a specified topic. As already pointed out, assets donated to a research association can be immediately expensed. Primarily for this reason, the Ministry of Finance has granted Research Association status in only fifty-one instances since the law was enacted. The tax expenditures by the Japanese Government associated with the granting of research and development association status came to no more than $13 million in 1982. In almost all such instances the associations which were approved were

planning to conduct research and development work in which some Japanese Government ministry or agency would participate. There is much joint research (usually intra-industrial group) which goes on in Japan which does not receive the tax benefits associated with Research Association status. Similarly, many participants in ventures which do receive Research Association status are not involved in cooperative research at all.

In addition to the Research Association Law, other statutes such as Law for Extraordinary Measures for Specific Machinery and Information Industries, the Provisional Law on Measures for the Stabilization of Designated Depressed Industries, the Environmental Hygiene Law and the Law Concerning the Organization of Small and Medium Enterprises all provide some exemptions from the Anti-Monopoly Law for the purpose of developing key technologies. Given the language of the Anti-Monopoly Law, given exemptions granted from the Law for the promotion of co-operative research and given the Anti-Monopoly Law's enforcement record it's hard to believe that even a joint research and development project which does not have a government sponsorship would run afoul of the JFTC. In the 36 years since the enactment of the Anti-Monopoly Law there has never been a case brought under it which alleged a conflict with the Japanese Patent Law.

VI. Summary and Conclusions.

A. Characteristics of Japanese Joint Research and Development Ventures.

1. With the exception of some civilian aircraft projects (which have a significant international cooperative component to them), all major government sponsored joint R&D projects are subsidized on a contract research basis. This means there will be a relatively easy access to patents for domestic and foreign competitors.

2. It is common for the Japanese technological leader in any particular activity to balk at participation in a Japanese Government sponsored project. Such reluctance suggests that many of these projects are more attempts to diffuse best practice than to overcome any particular technological bottleneck. Firms do apply to Japan Government to participate in joint projects. Only a fraction of those applying are accepted.

3. The government-sponsored joint R&D ventures do not always end in successful accomplishment. Many projects pursue research dead ends, and it is not unknown for projects to be suspended in mid-course.

4. While some joint research projects have elaborate joint laboratories, most joint ventures do not have such facilities. Virtually all government-sponsored joint ventures have attached to them a research and development association (kenkyū kumiai). Such research and development associations hold patents which result from the joint activity of several firms. Once the limited period of government aid to a joint venture is ended, it is characteristically the responsibility of the research and development association to continue to promote the ends for which the government money was first given. Since the joint character of many of of these research projects is relatively thin, it is not surprising that relatively little use is made of the tax provision allowing an immediate 100% write-off of assets which are donated to an approved research and development association.

5. Government-sponsored joint research and development ventures characteristically do not involve explicit commitments to share markets or to tie input purchase or output sales.

6. Government-sponsored joint research and development ventures are almost always justified by reference to the pressure of some foreign entity (typically an American firm or government agency) already spending on R&D more than is contemplated for the joint venture.

7. For most joint ventures the R&D activity outside the joint project but congruent with its objectives is much larger than what is conducted within the joint venture. Often this activity is undertaken by firms outside the joint venture and is not even remotely coordinated with the joint venture.

8. While joint research and development ventures which were not sponsored by the government used to be very rare, they have become more common in recent years.

B. Role and Import of Joint Research and Development Ventures.

9. Whatever signaling the Japanese Government may be doing with public-private joint research and development as to what might be promising new areas of development appears to evoke resource responses which seem modest by comparison with the performance of equity markets in the United States. Many of the effective elements of industrial policy which exist in Japan are an effort to overcome the distortion which may result from the long-time absence of well-developed capital markets in Japan.

10. In light of actual industrial performance in Japan it is hard to imagine Japanese Government-sponsored cooperative research and development projects as the fulcrum around which all industry research and development pivots. Even in the most celebrated instances, such projects involve only a small amount of the total R&D done for any technology. Firm performance is too diverse to make credible the charge that such projects are the foci of industry-wide research and development cartels.

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11. Japanese Government cooperative research and development projects must be understood as a partial substitute for what is achieved in the United States as a by-product of well-functioning markets for experienced scientific and engineering manpower.

C. Anti-Trust Law, Efficience and Joint Research and Development Ventures.

12. The Anti-Monopoly Law poses no barriers to joint R&D ventures in Japan.

13. The current character of Japan Government financing of joint research and development projects is such that there hardly be any concern from a monopoly perspective. Current arrangement, however, may provide insufficient incentives to innovative activity.

14. Many Japanese and non-Japanese firms left outside the joint research and development ventures have developed new processes and products with equivalent speed to the joint venture itself. This has been true from 64K RAMs through machine tools to elements of bioreactors.

APPENDIX 1

Partial Listing of R&D Projects Sponsored by the Japanese Government, by Industry Research Products, 1966-1981

Project area	Time schedule	Purpose	Funding Million yen (million dollars)	Type of funding	Companies involved
Computers	1972-76	Development of basic technology for 3d and 5th generation computers	8,700 $29.4	subsidy	Fujitsu, Hitachi, Mitsubishi Electric, NEC, Oki, Toshiba
Very Large Scale Project (VLSI)	1976-79	Development of basic technology for extra large scale integrators of 4th generation computers	30,000 $132.3	-do-	Fujitsu, Hitachi, Mitsubishi Electric, NEC, Toshiba
Development of basic software and related periphery	1979-83	Development of software for the 4th generation computers, particularly operating system software	47,000 $102.3	-do-	Fujitsu, Hitachi, Matsushita Electric, Mitsubishi Electric, NEC, Oki, Sharp, Toshiba
Pattern information processing system	1971-80	Development of technology for an information processing system capable of understanding patterns of words, colors, voice, and sounds	22,073 $82.7	contract research	Hitachi, Fujitsu, Matsushita, Mitsubishi, NEC, Oki, Sanyo, Electric, Toshiba, Koya Glass

Project area	Time schedule	Purpose	Funding	Type of funding	Companies involved
High speed scientific computer	1981-89	Development of technology for an information processing system	22,073	contract research	Fujitsu, Toshiba, NEC, Mitsubishi Electric, Sanyo, Matsushita, Konishiroku, Hoya Glass
Flexible manufacturing system using lasers	1977-present	Development of a complex production system which can produce various kinds of machinery components and parts in small batches	13,000	-do-	N/A
Software automation	1976-81	Develop capability for computers to write own software automatically	6,600 ($30)		Over 100 software firms
Development of 5th generation computers	1979-91	Deliberate investigation and development of 1990s computers based on the newest theory and technology	11,375 $45.5	-do-	Fujitsu, Hitachi, Mitsubishi, NEC, Oki, Toshiba
Aircraft--Cont. FJR-170 experimental engine	1971-81	Develop civil aircraft engine	20,400	contract research	IHI, Kawasaki, Mitsubishi
STOL aircraft--	1978-90	To develop a commercial short take-off and landing aircraft	25,000	-do-	Kawasaki, others

Project area	Time schedule	Purpose	Funding	Type of funding	Companies involved
Basic technologies	1981-1990	Develop technologies basic to industries of the 1990s	104,000	contract research	
A. New materials: High-efficiency separation film	-do-		N/A	-do-	Toray, Teiji, Asahi Chemicals, Kuraray, Toyobo
Conductivity macro-molecule	-do-		-do-	-do-	Sumimoto Daiseru Chemicals, Asahi Glass, Mitsubishi Chemicals
High crystalline macro-molecule	-do-		-do-	-do-	Toray, Teiji, Asahi Chemicals, Sumimoto Denko, Sumimoto Chemicals
Fine ceramics	-do-	Develop high strength corrosion-resistant and high-precision abrasion-resistant fine ceramic materials	14,160 (59)	-do-	Toshiba, Kyoto Ceramics, Ishikawajima Harima Heavy Ind. Kobe Steel, Showa Denko Sumitomo Denko, Asahi Glass, Electro-Chemistry, Nippon Glass Special Ceramics Kurosaki Ceramics, Toyota Machine Tools, Chinagawa White Brick Inoue Japan Res. Inst. Toyota Motors

Appendix 2

Case Study of MITI's Next Generation Industrial Technologies Joint Research and Development Projects in Biotechnology

There are presently two foci of biotechnology activity within the Ministry of International Trade and Industry. The first, but most recent, focus has been the three MITI biotechnology projects associated with the Jisedai sangyō kiban gijutsu kenkyū kaihatan seido (System for Promotion of Research on Next Generation Industrial Technologies). These projects have been housed within the Basic Industries Division of MITI. This agency has oversight responsibility for such industries as steel, non-ferrous metals and chemicals. Apart from energy-related concerns MITI's interest in biotechnology has been almost exclusively related to a more general program of structural adjustment for the extremely depressed basic chemicals industry. While significant biotechnology applications run the gamut from pharmaceuticals and food processing to textiles, eleven of the fourteen private sector participants in MITI cooperative research projects have been drawn from the chemical industry.

In order to better focus MITI activity in this area of biotechnology, MITI has established within its Basic Industries Division the Baiotekunoroji shinkō-shitsu (Office of Biotechnology Promotion). This office now oversees MITI's Next Generation

biotechnology projects and serves as a liaison between MITI's Baiotekunoroji sangyō chōki bishon antei iinkai (Biotechnology Long-Term Vision Advisory Group) and possible MITI efforts to obtain from the Japanese Diet special legislation governing the promotion of biotechnology in Japan. MITI's Advisory Committee whose membership includes government officials and leading figures from the business and academic community are potentially helpful in getting the appropriate visibility for the MITI Basic Industries Division's contemplated legislative program in this area. Special legislation in the Diet is desirable from MITI's point of view because such legislation would insure that its biotechnology promotion efforts would be insulated in considerable measure from the Ministry of Finance budget streamlining oversight. While such special legislation had been common for major subsidy programs, whether the Diet will pass such legislation for biotechnology remains in doubt. Subsidy programs, of whatever kind, have been a target of the Liberal-Democratic Party's Administrative Reform Program and it seems increasingly difficult to make a case for any special program, even for biotechnology. High profile American concern in the spring of 1983 with Japanese Government aid to high technology industries has made the passage of such programs even more unlikely.

The Baiotekunoroji shinkō-shitsu provides policy, but not technical oversight for MITI's biotechnology efforts. MITI does, however, maintain the technical capacity for such oversight and indeed does within its own laboratories conduct important research in the area of biotechnology. Such technology oversight and research capacity is housed within MITI's Kōgyō gijutsu-in (Agency for Industrial Science and Technology). The Kōgyō gijutsu-in maintains a Jisedai kenkyū chōseika (Next Generation Research Coordination Bureau). This office provides oversight for Next Generation projects being conducted by the fourteen private sector participants and the Kōgyō gijutsu-in's own research institutes. Kōgyō gijutsu-in's research institutes active in the Next Generation and other biotechnology projects include the Fermentation Research Institute, National Chemical Laboratory for Industry, Research Institute for Polymers and Textiles, Government Industrial Research Institute, and the Institute of Physical and Chemical Research. Some ten percent of the R&D work (by expenditure) under the Next Generation project is being conducted in these Kōgyō gijutsu-in laboratories.

In order to facilitate coordination by the Baiotekunoroji shinkō-shitsu and the Jisedai kenkyū chōseika the fourteen private sector entities receiving grants under the Next Generation Project have been organized into the Baiotekunoroji kaihatsu gijutsu kenkyū kumiai (Biotechnology Development Research Association). This research association has its own

central office through which the various companies deal with MITI. Other than this central office the Research Association maintains no supra- or inter-company institutions. For example, there are no common laboratories being maintained for the members of this research association.

The Next Generation project has been organized as an element in a structural adjustment program for the chemical industry. Prior to this project's initiation, but following the announcement of the Cohen-Boyer patent, five major chemical companies had organized a joint study group called Baiotekunoroji faorum (Biotechnology Forum). Baiotekunoroji faorum was instrumental in lobbying for the establishment of the Next Generation project.

While members of the Baiotekunoroji faorum have been welcome participants in Next Generation projects, support from the Japanese Government has been viewed with mixed feelings by some corporate actors in the biotechnology industry. While latecomers welcome the government subsidies and the opportunity to learn, those companies already advanced in their research and development have been reluctant to share their knowledge with potential and actual competitors. For example, Tanabe Sekuyu, a leading firm in work with bioreactors is not participating in any of the Next Generation projects. Kyowa Hakko, while playing a lead role in one Next Generation project, is not participating in areas of its greatest strength. Kyowa Hakko, a leader in

work on recombinant DNA is not participating in the Next Generation project in this area.

Quite apart from Japanese companies' reluctance to enter into cooperative research projects where they are under implicit obligation to disclose proprietary information, the form of this cooperative research project has also discouraged participation. Next Generation project grants have been classified as Itaku kenkyū (contract research). Only direct expenses are covered. This means time of research workers and operating laboratory expenses. No overhead is allowed and any capital equipment purchased is nominally the property of the Japanese Government. Most significantly all patents resulting from Itaku kenkyū work also belong to the Japanese Government. This is a major disincentive for companies to participate in Next Generation biotechnology projects.

MITI originally planned to have biotechnology sponsored under the hōjōkin (subsidy) system which would have allowed participating firms to keep the patents resulting from their research. The VLSI project, which has been considered a prototype for MITI's biotechnology work, was conducted on a hōjōkin basis. The Ministry of Finance successfully opposed MITI's plans, arguing that the thrust of Prime Minister Suzuki's Administration Reform meant no large new subsidies could be given except under the most extreme circumstances. How MITI

will treat each of the biotechnology patents it will come to hold will be determined on a case-by-case basis. Companies conducting the research on which a particular patent is based will almost surely get some preferential treatment. On the basis of past practice this might be expected to range from a discount on royalty through near exclusive licensing privileges. In view of the current controversy with the United States over industrial policy practices it seems unlikely that MITI would attempt to prevent foreign access to what new biotechnology patents it may come to hold.

Whatever disincentives may have existed for potential participants in the Next Generation Program, MITI's process for selecting participants was relatively closed. Given that the target group was the chemical industry, MITI sent questionnaires to two applied biochemistry associations asking them to survey their members' present activities and needs. On the basis of these surveys, fifty companies were invited to bid on the itaku kenkyū in August of 1981. The fourteen companies ultimately selected contained no real surprises. A number of smaller companies, not selected, did express discontent with the character of the selection process.

When the Next Generation Program for biotechnology was first discussed, projects in bioreactors, recombinant DNA, mass cell culture, and cell-fusion were planned. During budget negotiations with the Ministry of Finance the cell-fusion project

was dropped. This decision was not based on any devaluation of cell-fusion work which, along with bioreactors, mass cell cultures and recombinant DNA, is one of the four central biotechnologies, but rather because the chemical companies with which the Basic Industries Division of MITI was working were already rather more advanced in this area and because there were projects already being funded by the Ministry of Agriculture, Forestries and Fisheries, and the Ministry of Health and Welfare which would accomplish substantially the same purpose.

- Bioreactor Project--The Bioreactor Project has been divided into two sub-projects with Mitsubishi Chemicals as the overall project leader. Mitsubishi Chemicals is also the leader of the sub-project working on the acid reaction bioreactor. The other companies in this sub-project are Kao Soap, Daicel and the Mitsubishi Gas Chemical Co. The other two companies, Denki Kagaku Kōgyō and Mitsui Petrochemicals are working on a reactor based on a reduction reaction. Mitsui Petrochemicals is the leader of this sub-project. (See Table 2.1).
- Recombinant DNA Project--Sumutomo Chemical is the leader of the Recombinant DNA project. The other two participants are Mitsui Toatsu and Misubishi Kasei Institute of Life Sciences. The objective of this project is to discover new host-vector systems for B. subtiles, yeast and other micro-organisms. (See Table 2.2).

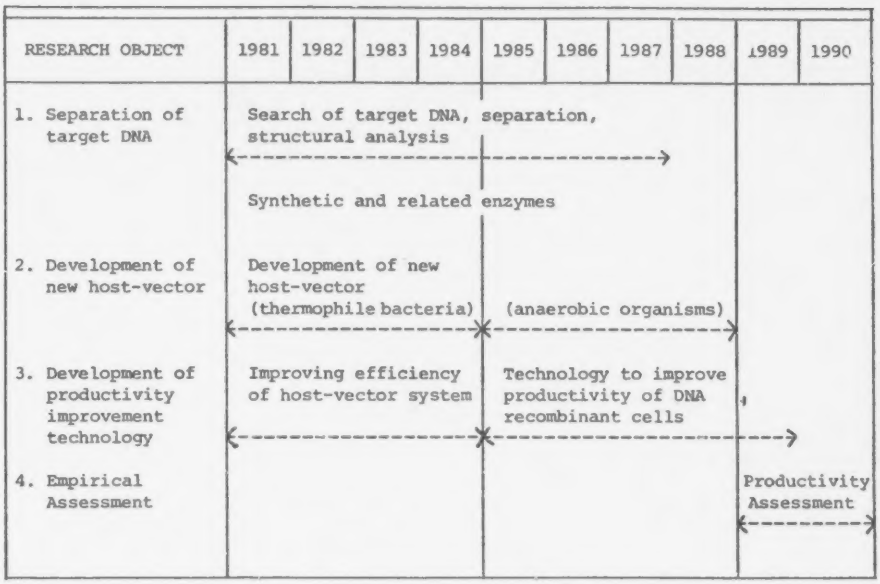
TABLE 2.1

LONG-TERM PLANNING OF R&D FOR BIOREACTORS

RESEARCH OBJECT	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1. Search for micro-organism for target enzyme	Search for micro-organism which produces target enzyme				Breeding and improvement of micro-organism					
2. Improving productivity of enzyme	Examining of stabilization methods for enzyme				Improving productivity of enzyme					
3. Immobilization technology for micro-organism and enzyme	Examining materials for immobilization of methods				Developing immobilization methods					
4. Developing optimal reaction methods					Developing optimal reaction methods					
5. Test, Assessment								Assessment of productivity of reactors		

TABLE 2.2

LONG-TERM R&D PLANNING OF UTILIZATION TECHNOLOGY FOR RECOMBINANT DNA



- Mass Cell Culture Project--This project is being led by Kyowa Hakko. Other participants include Asahi Chemical, Ajinomoto, Takeda Chemical and Toyo Jozo. This project is attempting to develop a substitute cultivation medium for animal tissue cultures. Such technology will be especially helpful in producing diagnostic pharmaceuticals and artificial organs inexpensively and effectively.

Representative LUNGREN. Thank you very much, Mr. Saxonhouse.

Next we will hear from Mr. Ray Randlett of the Allied Corp., appearing on behalf of Mr. Edgar Brower, president of Allied Electronic Components Co. for the American Electronics Association.

STATEMENT OF R. RAY RANDLETT, DIRECTOR, LEGISLATIVE AND REGULATORY AFFAIRS, ALLIED CORP., ON BEHALF OF EDGAR S. BROWER, PRESIDENT, ALLIED ELECTRONIC COMPONENTS CO., FOR THE AMERICAN ELECTRONICS ASSOCIATION

Mr. RANDLETT. Thank you, Congressman. Mr. Brower extends his apologies. Apparently even the high technology of modern jet aircraft was not sufficient to overcome the weather and the traffic jam in northern New Jersey today.

As you have stated, I am appearing on behalf of the American Electronics Association. That association represents over 2,300 member companies; 72 percent of those companies are small companies, employing fewer than 200 employees. Together the companies represent $140 billion in sales, which is 63 percent of the worldwide sales of the U.S.-based electronics industry.

We have heard this morning quite a bit of discussion of the need for this type of legislation. Much of it is focused on Japan. I would also note that the European countries are beginning to act in this area. France has nationalized its telecommunications industry. They are about to start a program called Esprit, which is designed to further their basis in information technology. Mr. Davignon, the vice president of the Commission of European Community, has proposed that they develop a tariff barrier around Europe similar to what they have in agriculture to protect this type of industry.

We have also heard this morning a description of the Microelectronic and Computer Technology Corp., MCC. Allied is a member of that organization.

MCC was organized on the strength of advance clearance from the U.S. Attorney General's office that such association was not illegal if set up to carry out basic research. This, however, is just one administration's interpretation of existing law. R&D is a long-term venture and most if not all of the projects undertaken by MCC will extend far beyond the life of the current administration. The MCC member companies need to establish the legality of our association to protect ourselves against possible future litigation.

So we are seeking basic clarifications in the law. The first would be that neither treble damages nor criminal liability should apply to R&D ventures. The liability should be limited to actual damages or civil injunctive relief.

A second clarification would be to provide total immunity from actual damages for R&D joint ventures which were organized under a legislatively prescribed set of standards or with full disclosure to the Justice Department or FTC.

The third requested clarification would provide that the losing party in litigation involving joint R&D ventures would pay the winning party's attorneys' fees.

We believe these modifications would go a long way to encourage major cooperative research programs. These laws would still permit the Justice Department to scrutinize the operations of joint research ventures to make sure they do not go beyond their research charter to move in the direction of conspiracies to control markets. Both the Justice Department and private litigants still would be able to institute court actions to enforce the law.

The clarifications we seek would remove uncertainties for other companies which might choose to follow the example of MCC. We believe the threat to American industry in the international marketplace is very real. The development of new technology will play an important part in determining how competitive American companies will be in the years ahead.

Industry is not asking the Congress to resume the level of research support once provided by the Government. It is willing to share the costs among its member companies. It asks only that the Congress modify the antitrust laws to permit technological cooperation without the threat of future retribution.

[The prepared statement of Mr. Brower follows:]

Prepared Statement of Edgar S. Brower

- The position of American business in the industrialized world has undergone drastic change over the last two decades. American leadership of many industries has been lost to skillful and aggressive competitors from abroad, especially Japan, and foreign companies now enjoy large shares of the U.S. market for many products.
- American industry is struggling to meet the challenge to retain primacy in industries it still leads.
- If American business is to have a fair chance in this struggle U.S. antitrust laws need to be clarified.
- AEA supports proposals that would provide total immunity from actual damages for any R&D joint venture organized either under a legislatively prescribed set of standards or with full disclosure to the Justice Department or FTC. Also, we support provisions which allow antitrust defendants to recover attorney's fees when they prevail.

Mr. Chairman and members of the committee, my name is Ed Brower, and I am president of Allied Electronic Components Company, an operating unit of Allied Corporation.

Allied Corporation is a diversified producer of chemicals, oil and gas, electronics, aerospace, automotive and health and scientific products. My company is a supplier of components used primarily in electronic markets such as telecommunications, computers, business equipment and military/aerospace.

I am appearing here today on behalf of the American Electronics Association (AEA). AEA represents over 2,300 member companies nationwide and over 400 financial, legal and accounting organizations which participate as associate members. AEA

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encompasses all segments of the electronics industry including manufacturers and suppliers of computers and peripherals, telecommunications equipment, defense systems and products, instruments, semiconductors and other components, software, research and office systems. The AEA membership includes companies of all sizes from "start-ups" to the largest companies in the industry. But 72% are small companies employing fewer than 200 employees. Together our companies account for $140 billion in sales - 63% of the worldwide sales of the U.S. based electronics industry.

The Need - Required By A Changed Environment

The position of American business in the industrialized world has undergone drastic change over the last two decades. American leadership of many industries has been lost to skillful and aggressive competitors from abroad, especially Japan, and foreign companies now enjoy large shares of the U.S. market for many products.

American industry is struggling to rebuild, to regain lost leadership positions and to retain primacy in industries it still leads. To do so, it must learn to contend successfully with three factors which most experts agree have contributed significantly to our loss of market share.

First is the fact that American business does not have equal access to all world markets. Foreign competitors take refuge behind artificial nationalistic barriers raised to maintain

employment and economic stability. Individual business firms have little power to modify these barriers. This is an area where the power of government is needed, and indeed the U.S. government has played an admirable role in checking and correcting many unacceptable practices. It must continue this function if American business is to have a fair chance at penetrating certain foreign markets.

Secondly, American industry is not cost competitive in many areas. Productivity in many American industries is lower than in some other countries, largely because of labor costs which in America escalated for many years at rates higher than inflation and because of our failure to replace old production methods and old machinery with modern, state-of-the-art processes and equipment. In the profitable 60's American business grew careless and ignored the signs of growing foreign industrial capabilities. Now it is working to repair the damage by rebuilding and modernizing production equipment and methods; rationalizing plants and entire businesses for more efficient production; seeking to restrain labor cost increases; and exploring other ways to improve productivity and cost competitiveness.

The third factor involves the subject of this hearing: technology. In many industries America has lost its once-great technological pre-eminence. It must regain technological leadership if it expects to regain industrial leadership. America outdistanced the rest of the industrialized world in the

post-World War II years, aided greatly by spinoffs from the U.S. space program in the 1960's. But once we put a man on the moon, the federal government started reducing grants for basic research, and business could not, or did not, pick up the slack. The result was that in many areas we stood still, or moved forward very slowly, while foreign competitors were making rapid strides in the development of new technologies.

American business is now working hard to make up for lost time. R&D budgets are rising substantially once again. But establishing technological leadership today is a vastly more difficult task than it was 25 years ago. As technologies grow more complex, they take longer to develop and cost far more. Many of our foreign competitors have met this problem by pooling their R&D resources. In Japan joint research is carried out under the auspices of the Ministry of International Trade & Industries (MITI). In some countries, R&D and other resources are pooled by nationalizing an entire industry, as France has nationalized its telecommunications industry.

American business needs to be able to share the enormous costs of basic research, as foreign competitors are doing. But American business is burdened with antitrust laws which do not apply to its foreign competition. If business is to have a fair chance in this struggle, U.S. antitrust laws need to be clarified.

U.S. Antitrust Laws Need To Be Clarified

The urgent need for joint research has already resulted in the formation of the Microelectronic and Computer Technology Corporation (MCC) earlier this year. MCC is a cooperative effort of 13 companies in the electronics industry, including Allied.

It will work to develop a broad base of fundamental technologies which the member companies will then use to develop their own products and services. MCC has established headquarters at Austin, Texas, and is assembling a scientific staff under Admiral Bobby Inman, who formerly headed the National Security Agency.

MCC was organized on the strength of an advance clearance from the U.S. Attorney General's office that such an association was not illegal if set up only to carry out basic research. This, however, is just one administration's interpretation of existing law. R&D is a long-term venture, and most, if not all, of the projects undertaken by MCC will extend far beyond the life of the current administration. The MCC member companies need to establish the legality of our association to protect ourselves against possible future litigation and adverse court decisions.

The clarifications sought in antitrust laws by the association I represent are few. The first is that neither treble damage nor criminal liability should apply to any R&D joint venture. Liability should be limited to actual damages or civil injunctive relief.

A second clarification we seek would provide total immunity from actual damages for any R&D joint venture organized either under a legislatively prescribed set of standards or with full disclosure to the Justice Department or FTC.

The third requested clarification would provide that the losing party in litigation involving joint R&D ventures would pay the winning party's attorney's fees.

We believe these modifications would go a long way to encourage major cooperative research programs designed to restore America's technological leadership. They would do nothing to lessen the competitiveness of American business firms or weaken the antitrust laws.

These laws still would permit the Department of Justice to scrutinize the operations of joint research ventures to make sure they do not go beyond their research charter to move in the direction of conspiracies to control markets. Both the Justice Department and private litigants still would be able to institute court actions to enforce the law.

The clarifications we seek would remove uncertainties for other companies which might choose to follow the example of MCC. The threat to American industry in the international marketplace is very real. And the development of new technology will play an important part in determining how competitive American companies will be in the years ahead. Industry is not asking the Congress to resume the level of research support once provided by the government; it is willing to share the costs among its member companies. It asks only that the Congress modify the antitrust laws to permit technological cooperation without the threat of future retribution.

Representative LUNGREN. Thank you, Mr. Randlett.

Let me ask a question of Mr. Lacey first. I know you touched on this in your prepared statement, but I would like you to expand on it a little bit.

In discussing the need for any legislation in this area, the first question that comes up is: Where is your proof that these things are being hindered at the present time? We do not have many examples of that. We touched on that question a little bit today.

The second one is: Right at the time you are asking the Congress to clarify the law, we have the prime example of MCC. If formation of joint R&D ventures is as difficult as you suggest, why would reasonably intelligent businessmen, who obviously do not want to run afoul of the antitrust laws, take this risk if, in fact, there is an undue risk that some of you suggest requires a change in the law.

How do you respond to that?

Mr. LACEY. Well, perhaps in two ways, Congressman.

First, there has been, and was, significant fallout of firms who had looked at the possibility of joining MCC and declined to do so. In all cases that I remember, the antitrust laws were a factor in that decision. I cannot tell you that they were the dominant factor or that they were the exclusive factor.

Typically, of course, businessmen weigh the advantages and disadvantages of any action. And clearly in those cases where companies decided not to join MCC—and I believe in the cases of those companies that have also joined MCC—there is a significant negative factor which has to do with the uncertainty with respect to the antitrust laws.

However, my judgment is then, that for those companies that decided to join MCC—and it was the case with Control Data—that the positives of survival that come from joint cooperative R&D that we could not otherwise achieve outweighed in our circumstances the negative of antitrust uncertainty. But the risk is still there.

The second part of the answer that I would give you is that it is commonly assumed that MCC has been given clearance by the Justice Department. That is not the case. The MCC umbrella organization has been given clearance.

I might just digress to say that in terms of the bureaucratic evidence of all that, on public television Mr. Baxter said that the Justice Department gave a brief look to the MCC activity and cleared the umbrella organization. I should tell you that that brief look was 5 months duration and it cost the companies involved many thousands if not hundreds of thousands of dollars to participate. And that was characterized as a brief look.

Representative LUNGREN. That is a Washington brief look.

Mr. LACEY. But the fact remains that we are now in the throes, and have been since I believe July or August—I will not be held precisely to that date—in revealing the specific plans of each of the technology programs, the identity of the participants in each of those programs, providing the Justice Department with enormous amounts of data concerning the products and services of the companies, where they are sold, and our best understanding of what the competition is doing in those areas, et cetera, et cetera. And that is going on, and I do not see any possibility that that will be resolved for several more months.

So it is not a fact that MCC has been cleared. It is a fact that the umbrella organization has been cleared. The programs themselves, the individual technology programs, are still subjected to significant scrutiny.

Representative LUNGREN. Mr. Randlett, could you respond to that from the standpoint of one of the companies who was involved in the MCC decision?

Mr. RANDLETT. I would endorse that statement: We certainly approach it with a great deal of nervousness. And while our attorneys are convinced that MCC's activities are very legal, we are also concerned that we may have, in addition to the costs involved with dealing with the Justice Department, the costs of dealing with attorneys, outside attorneys, who choose litigation to find out if it is legal.

Representative LUNGREN. As I understand it, all the participants have received a letter, at least from one law firm, indicating they viewed this with a jaundiced eye.

Mr. RANDLETT. Yes.

Mr. LACEY. Yes.

Mr. RANDLETT. I should say that when I speak of costs, if we should find ourselves in litigation at some point, it is not only the direct financial costs; it is the executive time that is involved in responding to something like that.

Representative LUNGREN. Also, as a trial attorney, I recall that we usually take a little bit of time to speak with experts, both for whomever we represent and if we have to engage outside experts, and those experts normally have to be the people who are truly involved with the research and development. At some point down the line you are going to engage those people in a great deal of work that has nothing to do with the end product of research and development. As much as I enjoyed being a trial attorney and litigating, I understand that the ends of litigation are not always the ends that best serve the clients involved.

Mr. Saxonhouse, what lessons do you think are appropriate for application to the U.S. experience from how Japan has looked at the R&D? I understand the major tenor of your observations, which is that the way they have applied the joint R&D in Japan has been to solve the particular problems they have. That is one of the things I think we always have to think about when we are looking at other countries' experiences. But nonetheless, are there any applications that you think would be relevant to our consideration of the problem as we see it in U.S. experience at present?

Mr. SAXONHOUSE. Well, I think that, as you point out, much of the motivation for Japanese practice stems from problems which the United States does not face. But at the same time, I think the experience with these joint R&D ventures—and I should point out—I was struck by Mr. Herz' comments when he outlined the number that take place in the United States. I think you said 23 in——

Mr. HERZ. Twenty-one from 1977 to 1979. But those were the ones, Gary, that you could identify from published reports, so there presumably were some others. But I doubt there were very many of them.

Mr. SAXONHOUSE [continuing]. I was struck by that, despite the fact it is inconceivable that almost any joint R&D venture would be disallowed by the Japanese Government, it turns out that there were

fewer joint R&D ventures that took place between 1977 and 1979 in Japan than apparently take place in the United States, notwithstanding the threat of antitrust violation—which I think just serves to point out that in many instances, as Mr. Lacey said, there are good economic reasons for not participating in such projects.

I think one sees in Japan that in many, many instances the leading firms in the industry are reluctant to participate for fear of losing some proprietary information, and that the market acts to perhaps in its own way prevent a serious anticompetitive result. That is to say, a coalition of firms, which is likely to be a serious antitrust violation, might not result, at least very often has not resulted in Japan, simply because firms with dominant market power do not wish to share what information they have with some of the smaller fry.

So what characteristically happens in the Japanese situation is a group of second-tier firms—and that is not always true; there are certainly cases in computer and semiconductors where this is not true—but characteristically a group of second-tier firms will get together, and will be aided by the Government. If the Government or the financial community can apply sufficient pressure to some of the leading firms in the industry, they will be able to grab some of them for their projects. Sometimes they will be successful; sometimes they won't be. But regardless of whether a leading firm is secured, a joint venture will be formed. The joint venture is often successful; sometimes it is not successful. Characteristically; this second-tier firm initiated joint venture does result in the improvement of the average technological performance of the particular industry in which it exists in Japan. To this extent I think such ventures have a salutary influence on competition in Japan by improving the competitive status of some of the nondominant firms in the industry, and also because it adds another important competitor to the global industry.

Characteristically, these projects are not organized in Japan except where you can point to existing United States or European dominance of a particular industry. They look and they see that there is a venture underfoot in the United States or in Europe which is likely to be a dominant factor in the industry's future. They get frightened. They organize their own venture.

It seems to me that this activity serves a competitive purpose that is not generally viewed, it seems to me, as anything like a restraint of competition.

Representative LUNGREN. One of the things that I got out of your testimony is the lack of ready exchange of professional, scientific, and research information among the Japanese, and you suggest that the joint research and development venture helps to overcome that.

Once they engage in these ventures, is there an atmosphere for the sharing of that type of information and that type of research, or are their joint R&D ventures somewhat inefficient or ineffective as a result of this attitude that the professionals bring to it?

Mr. SAXONHOUSE. Well, I think the experience in Japan, it seems to me, is varied. In some instance these joint ventures are not joint ventures at all. They are a group of companies who are going their own way that are grouped for purposes of getting some tax advantage together and called a joint venture. They are not a joint laboratory. There are no common facilities. The results of the joint project are separately patented.

In other instances, however, in some of the more celebrated instances, there are in fact joint laboratories and there are joint projects which scientists from different firms work on.

In some instances this works out quite well, and there is a real sharing of information. But I am struck over and over again by reports that come out of Japan of the enormous amount of time it takes to overcome mutual suspicion and to get a real feeling of cooperation, that they are all in it together.

This is the natural result of companies briefing their personnel in the same way that American companies brief their personnel before they go to a professional meeting, "Don't give away proprietary information. Play your cards close to the vest. Get as much information as you can and at the same time give up as little information as possible."

This is the natural result of firms that compete together rather strenuously. And I should point out that characteristically the firms in Japan, when they do get into these joint ventures, they do continue to compete with one another. The joint venture is not a capstone of a cartelization of an industry but rather a specific limited step which accomplishes a particular purpose. And I think to that extent perhaps, for those in the Congress who are concerned that by allowing joint ventures in the United States this will have an anticompetitive result, I think the Japanese experience should arrest their fears.

At the same time, those in the Congress who point to these joint R&D ventures as yet another example of unfair competition on the part of Japan, I think they are really off base, because they are not the lynchpin of some research cartel.

Representative LUNGREN. It is interesting that you mention that, because as we are testifying here, we have a discussion over on the floor of something known as the domestic content bill—some of us refer to it as the domestic discontent bill—on which we are going to vote later on.

Mr. Lacey, when we deal on the whole question of antitrust, we always go back to the bottom line of what the purpose of our antitrust laws is, and that is basically to promote competition and to maximize consumer welfare.

How do you respond to those who say this is an opportunity for businesses to cooperate instead of compete, and that this necessarily runs against the major tenets of antitrust law.

In other words, how would you suggest that joint R&D ventures in fact contribute to those same objectives?

Mr. LACEY. I think one very important point to make is that the technology development cost resources, both from the skill and the financial point of view, are so great, at least in my industry, microelectronics and computer industry, that I think over the next 20 years, without the opportunity to spread that technology to smaller firms, we will end up with a few very large firms, as we have today in the automobile industry in the United States.

I believe that by sharing in the development of this advanced technology, which then the individual venturers—and I stress this very heavily, that I am not talking about any kind of product development

activity or marketing or manufacturing activity, but simply the activity of providing to as broad a based membership in the industry as possible the advanced technology which they need to develop products of their individual conception and design for a marketplace of their own choice. And that is where the competition is.

If we fail to allow or get that technology broadly spread through the industry, then I fear that we will end up with a very few powerful firms dominating the world markets in microelectronics and computers.

Representative LUNGREN. The treble damage problem has, I think, received a considerable and fair amount of attention with respect to joint R&D ventures. Can you explain from the standpoint of someone involved in a business how it would be taken into consideration when you make a decision either to get involved in joint R&D or not? Is it a major consideration?

Mr. LACEY. I think, Congressman, it is a very major consideration. The difficulty with this whole subject—there are several of them. One is that what is deemed today to be an acceptable activity may not be deemed with 20/20 hindsight 5 or 10 years from now when the results of that venture are apparent. And the problem is that the more successful the joint venture is in terms of developing the technology, the more likely it is to be subjected to lawsuits.

If the technology venture has failed to produce the desired technology, then the likelihood of lawsuits is very small, because there is no advantage for the plaintiff if he prevails.

Representative LUNGREN. So the more successful you are, the greater the possibilities of damages.

Mr. LACEY. The greater risk that you have. And that is a very difficult thing to balance.

I do believe, though—and this is belief; I am not an attorney or a lawyer who can quote you chapter and verse—I do believe that there is a significant amount of spurious lawsuits that occur as a result of the opportunity for a big pot of gold at the end of the rainbow called triple damages.

And I think that removing that capability and also adding the capability to allow costs——

Representative LUNGREN. Attorneys' fees.

Mr. LACEY [continuing]. Attorneys' fees to the party that prevails would be a significant deterrent for those spurious lawsuits.

Representative LUNGREN. I am trying to bring into focus what Mr. Saxonhouse has said about the difficulty of initially getting scientists from different firms in Japan working together.

I had seen some remarks suggesting that the MCC type of approach was not that important because some people could not believe that companies involved in a joint venture such as that would release their very best people to be involved in a joint research project which may or may not have some positive results down the line from a profit standpoint, and that therefore the theoretical efficiency of research to be developed as a result of a joint effort are lost.

How do you respond to that?

Mr. LACEY. Well, first, I should point out that MCC has a free rein to recruit wherever it will. That is, the personnel needs of MCC are not required to be satisfied only from the member firms. Admiral Inman has complete freedom to recruit the very best talent he can from wherever. I am sure different companies will take different views about the reluctance or otherwise of letting their very best technologists go.

I should point out, however, that almost all of those companies have very widespread research and development activities of their own, and we are really talking about a very limited number of people. Control Data Corp., for example, has about 5,000 technologists—computer scientists, engineers, technicians—working on company-sponsored research and development. I would judge if we have 20 or 30 of our scientists within MCC, that will be about the size of it. So we are talking about a very, very small percentage of the total. We are talking about very good people, though, because that is key to the success.

Now, as far as the motivations of the businessmen are concerned, I think it is important to point out that there are two needed attributes of MCC. One is the creation of the very best technology that can be created within MCC. The second one, and perhaps the more difficult one for the companies, is to make sure that that technology is transferred from MCC and utilized within the company for the development of advanced technology products. Therefore, from the businessman's point of view, at least from a senior executive's point of view, it is very desirable that we have the very best people, because they are the principal vehicle for extracting that technology and bringing it back into the company.

Now, I can't tell you that the individual program manager who is going to lose one of his key people down in the organization feels that way, but certainly within Control Data the two management feels that way.

But I would guess again that as in any group of people who are trying to work cooperatively together, the motivations and decision of how to solve that problem will vary in each case.

Representative LUNGREN. I will ask you about a specific case. Under the organizational structure that prevails under MCC, does any company have the right of veto power against a request by Mr. Inman to take somebody?

Mr. LACEY. If I remember correctly, the bylaws say that Mr. Inman or his delegate would have to ask the board member, the representative from the company, or notify him of his intention to talk to the person. There is no veto capability. Admiral Inman can go if he wishes and attempt to recruit that person. Of course, if the person chooses not to move to MCC, that's another matter.

Representative LUNGREN. Of course. But now it is a sort of coming together of the minds to see if it is in the best interests of everyone concerned?

Mr. LACEY. That is right.

Representative LUNGREN. Yes.

Mr. HERZ. MCC is probably the first joint R&D venture in this country of its type. And we are seeing the first stages of developments that seem to me are a reaction to the long time scale of the research. A lot of these things will have to be worked out over time, but it does not follow that because in the early stages MCC may have some difficulty in getting the best people out of the companies—because the companies themselves must have lots of hesitations and concerns about how this is going to work and whether they will benefit from it—that those problems will not find solutions over the longer term.

Representative LUNGREN. I guess what we are saying is that there are as many reasons that executives can give to join in these things as there are reasons they might not want to. But to the extent we can make antitrust law neutral with respect to joint R&D ventures, as long as they are not moving in clearly anticompetitive spheres, we ought to do that.

Mr. HERZ. Yes; and I would add in that connection one small thing to what Mr. Lacey said a while ago: Is antitrust anxiety, a real deterrent to the formation of joint R&D ventures? My guess is that it may be a bigger problem in the earlier idea stages than it is at the later stages when you have sophisticated antitrust lawyers rather than some junior fellow on the house counsel staff advising people, or businessmen relying on what they know in advance about the antitrust laws.

MCC is clearly the result of the work of a high-level man with a vision about where he wanted to go, who pushed by a lot of obstacles to get things started to the point where you could get that level of sophisticated antitrust advice and the like.

That is one of the major reasons why Congress should send a signal to folks out there, "Hey, R&D joint ventures are different."

Mr. LACEY. I would concur with Mr. Herz's remarks, except to say one thing: That signal should have an aura of permanence about it, not something to change next week if attitudes change.

Representative LUNGREN. I understand. I particularly take note of Mr. Randlett's comments about the approval or at least the initial approval of MCC by this Justice Department, and that you need something more permanent. I am going to work my hardest to see this administration stays in a little longer, which gives you more sense of permanency, but I know you want something longer than that. And I think Congress is moving slowly to that sort of realization, that this may be one part of the whole puzzle we have to put together in making sure that our industry competes worldwide.

I want to thank you, Mr. Saxonhouse, for appearing because sometimes the myth and the reality of Japan are two different things when we deal with that nation in the Congress. I have always thought that we ought to review our antitrust laws with respect to whether their procompetitive foundations are being defeated, because the laws as we articulated them 100 years ago or 70 years ago may not now comport with present reality. Competition in an international setting may lead us to very different policy decisions compared to the previous era when competition was principally a domestic force. I have always felt we ought not to make changes in antitrust policy to echo the

Japanese experience, but look at what they have done and see if that gives us any guidance, and then, within our own experience of antitrust in terms of our goals, see whether we can fine tune the law to make sure those goals are in fact practically achievable under current international competition.

I would like to thank all of you for appearing. It has been very helpful to me. I am sure it is going to be very helpful to the committee.

Your prepared statements will be part of the record and, as I say, my major interest in having this hearing was to focus on the question of the need, because somehow we have skipped over that in much of what was done here on the Hill. I did not want to see this whole effort fall apart at the end because there is a question of whether there is any need at all.

So I thank all of you for appearing and giving us the benefit of your testimony. The committee will now stand adjourned.

[Whereupon, at 11:48 a.m., the committee adjourned, subject to the call of the Chair.]